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MECCANO MAGAZINE

SUMMER DAYS

6D.

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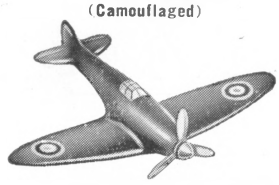

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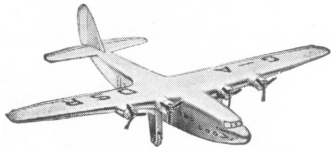

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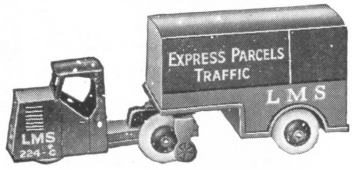

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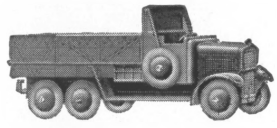

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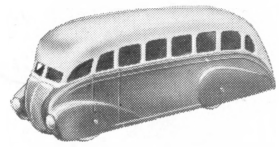

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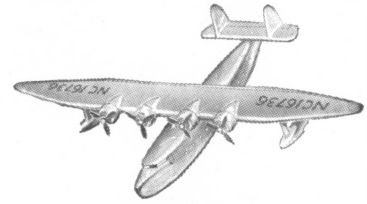

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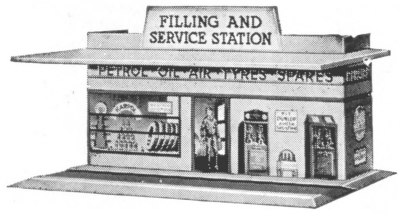

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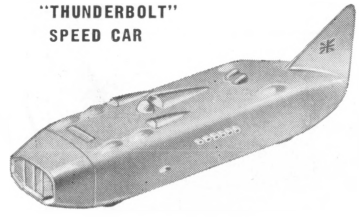

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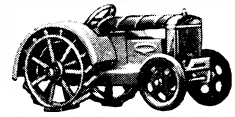

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SPECIAL NOTICE

Will readers of the "*Meccano Magazine*" please note that, due to pressure of other work, we have been compelled temporarily to discontinue our Repairs Department, and no further work of this kind can be accepted.

When we are able to resume work in our Repairs Department we will at once make an announcement in the "M.M." and to our dealers.

MECCANO LIMITED

MECCANO MAGAZINE

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Binns Road, Liverpool 13
England

Vol. XXVI. No. 7
July 1941

With the Editor

These Summer Days

I chose the subject for this month's cover for its beauty and for its atmosphere of peace. Until this war is won and the world made safe from madmen of the Hitler type we must all concentrate to the utmost on meeting every call made upon us; but at the same time we must not allow the sordid misery of war to fill our lives. Even those of us who live in the "blitzed" areas still have the sunshine, the trees and the flowers.

We shall win the war; the brute beast that is Nazi Germany will be trampled underfoot. But to do our share in this we shall need all the health and energy we can build up in the woods and fields these summer days.

* * * *

Next month's issue will include a thrilling account of life-boat rescues at Dunkirk and elsewhere, and the first of two fine articles by *"Railway Engineer"* on railway working in Australia. Other articles will describe the building of a modern United States airport, and an interesting early steam carriage. All the regular features will be there.

Leaders in the War

XX.—General de Gaulle

General Charles A. J. M. de Gaulle was born at Lille in 1890. He was educated for the French Army at St. Cyr Military Academy and the École de Guerre.

In the war of 1914-18 he served on the Western Front. While a Lieutenant he was wounded when leading his men in a counter-attack on Dinant, was awarded the Legion of Honour and promoted to Captain. He was again wounded on two occasions, on the last of which he was taken prisoner by the Germans. He made five unsuccessful attempts to escape; once he was free for a fortnight before being recaptured.

General Charles André Joseph Marie de Gaulle, leader of the "Free French" Army.

After the war he returned to France, and later fought in Poland, where he was awarded two decorations. For a time he was a professor at St. Cyr, and afterwards was appointed to the French General Staff.

De Gaulle was one of the first in France to realise the great possibilities of army mechanisation, and he was Colonel of a French Tank Regiment at the time the present war began. He wrote a notable book stressing the importance that mechanised units would play in the next war, but although this attracted widespread attention it failed to lead to any practical results. When France collapsed last year de Gaulle refused to serve in the French Army that accepted the Vichy Government, and by a court martial he was deprived of his nationality and sentenced to death. He was in London at the time, however, and there he began the formation of his now great army of "Free Frenchmen" who have allied themselves to Great Britain to carry this war to a victorious end.

* * * *

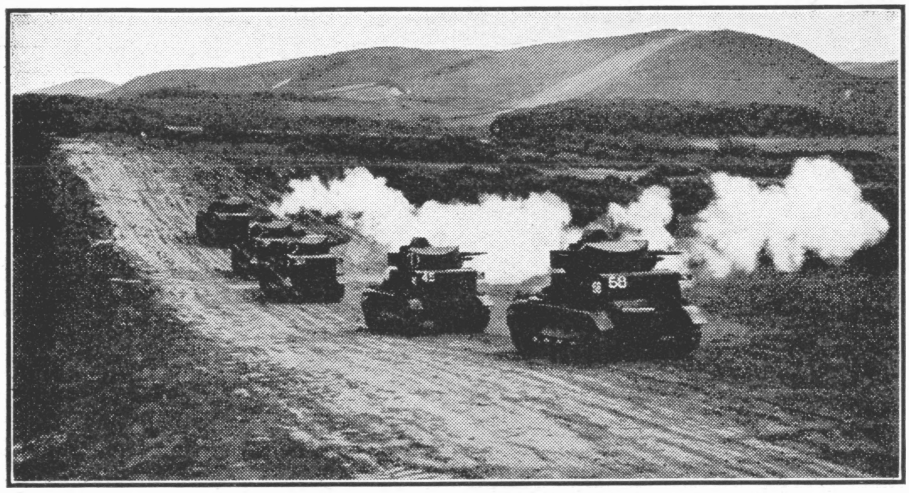
Readers will be interested in the appointment of Air Marshal Sir Philip Joubert de la Ferte as Air Officer Commanding-in-Chief, Coastal Command, R.A.F. Most of us remember his striking broadcasts, which unfortunately he was unable to continue. We hope to reproduce his portrait next month.

Sir Philip has succeeded Air Chief Marshal Sir Frederick William Bowhill, who after four years as head of the Coastal Command has been appointed to command the organisation ferrying American aircraft across the Atlantic. The work of this organisation will increase as aircraft deliveries are accelerated.

Tanks and Bren Gun Carriers

By Captain J. E. A. Whitman

OF the origin of tanks much has been written. It seems possible that the chariots of classic days supplied the inspiration which has in our own day found expression in mechanised fighting vehicles. With the fearsome scythe blades that were affixed to their wheels, the chariot charge of old must have inspired terror by its very appearance, and for a while its performance was deadly. But it is perhaps comforting to recall that for this bane an antidote was found. Quick-witted enemies trained companies of specially athletic fighters who lay on the ground and either hamstrung the horses or cut the traces as the chariots dashed by, after which swordsmen rushed in and finished the business. So, in our own day, skilfully thrown hand grenades have checked the progress of many tanks, and riflemen have seen to the rest of the job.



Tanks in action. Firing at a moving target.

In 1903, Mr. H. G. Wells wrote a short story, *"The Land Ironclads,"* in which he depicted a fighting vehicle, heavily armed and armoured, which almost exactly describes the heavy tanks in use to-day. In 1915 a design for such a landship came to the notice of Mr. Winston Churchill, then First Lord of the Admiralty, who ordered the construction of some trial tanks. At a demonstration of their capabilities Lord Kitchener was not impressed, but others were; and eventually tank formations took the field in the later stages of the battle of the Somme.

The actual term "tank" was used for reasons of secrecy. The vehicles were manufactured secretly, and for a long time the personnel was described as belonging to the Heavy Machine Gun section. Had a name such as landship, or land ironclad been used, the enemy might have guessed what was in the wind; whereas of course the word tank conveyed no sort of clue. And the name has remained in use.

In their first battle the use of tanks was somewhat haphazard and the results not so notable as they might have been. But the possibilities of the new weapon impressed everyone, and tactics for its use began to be evolved. The next year, at Cambrai (1917), good use was made of tanks; and in the great attack of 8th August 1918 no less than 475 tanks were thrown into battle, with great success.

The first years of the peace saw little progress in the mechanisation of the Army or in Tank design, but as time showed that the menace of war was by no means past, more attention was given to the matter. With such money as could be wheedled from a reluctant Treasury valuable experiments were conducted, with the result that when Britain entered the present war it was with a clearly defined policy of mechanised warfare and with many units well organised and trained to apply that policy. The only drawback was that whereas we, as a peace-loving nation, had provided these weapons in tens and twenties, Germany, bent on war and nothing else, had built them in hundreds if not thousands.

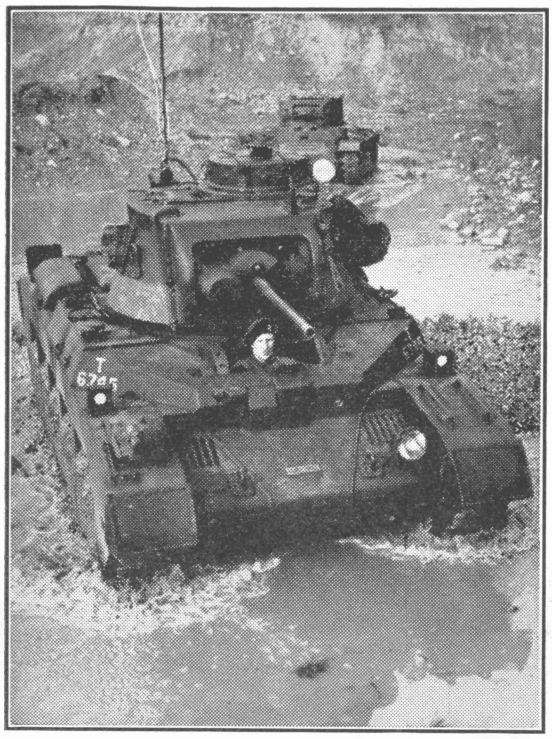
There are three main types of mechanised fighting vehicles — the Heavy Tank of the Royal Armoured Corps, the Light Tank with which our cavalry regiments are equipped, and the Bren gun carriers that belong to the machine gun companies of the infantry battalions.

The Heavy Tank is essentially a vehicle for combat, as opposed to the Light Tank, which is a machine for manœuvre. Of course both can manœuvre, but while the first seeks to smash its objective by its great fighting power, the second is meant to move far and fast and to bring its fire power to bear in sudden bursts from unexpected quarters. The work of the two may be compared with the relative functions of battleships and cruisers in a fleet; and in similar fashion the heavy tank works in squadrons while the light tank works in small groups or even singly.

A typical heavy tank is armed with two-pounder guns, highly effective weapons against artillery or other armoured vehicles (it must be remembered that the range at which they fire is usually short); heavily armoured over all vital parts, and equipped with searchlights to aid night fighting. All tanks are fitted with radio sets, the Commander of each group issuing his orders to his units by this method. The heavy tanks with which we entered the war weighed some 25 tons and possessed a speed of rather over 20 miles an hour, but later models have been evolved of greater weight and increased speed.

Britain was the earliest of the powers to experiment with Tank regiments and brigades, extensive manœuvres of the kind having been practised from 1928 onward. But Germany, building tanks in vast numbers, naturally had such a preponderance of strength in the Battle of France that she won through by sheer weight of numbers. In skilful handling and tactical brilliance, however, the British showed their superiority from the first encounters.

A German "Panzer" division is an all-mechanised force which has as its spearhead no less than 450 tanks; these make the main attack. A reconnaissance battalion of motor cyclists, side-car crews and men in light armoured cars pave the way as skirmishers used to do in older



Tanks crossing a stream.

battles; behind the tanks come two battalions also in armoured cars and troop carriers, known as the occupational troops who consolidate and hold positions captured by the tanks.

It was with this kind of formation that we had to contend with quite inadequate forces during the Battle of France. Outside Arras a brave attempt was made by a tank force to close the gap caused by the defection of the French troops. Only seven heavy tanks were available, these being supported by some 30 light tanks; but for some hours the German advance was held up, sheerly by clever manœuvring. Eventually we lost the seven tanks and a number of the light tanks, so the attempt had to be given up; not, however, without our having caused the enemy heavy losses.

Recent news from the Libyan campaign is, however, more encouraging. General Wavell has shown the Germans that he too knows how to make clever use of mechanised units, and now that the numbers available are such as to give us a reasonable force the German tank attacks on Tobruk and elsewhere have been repeatedly flung back in disorder and with severe loss.

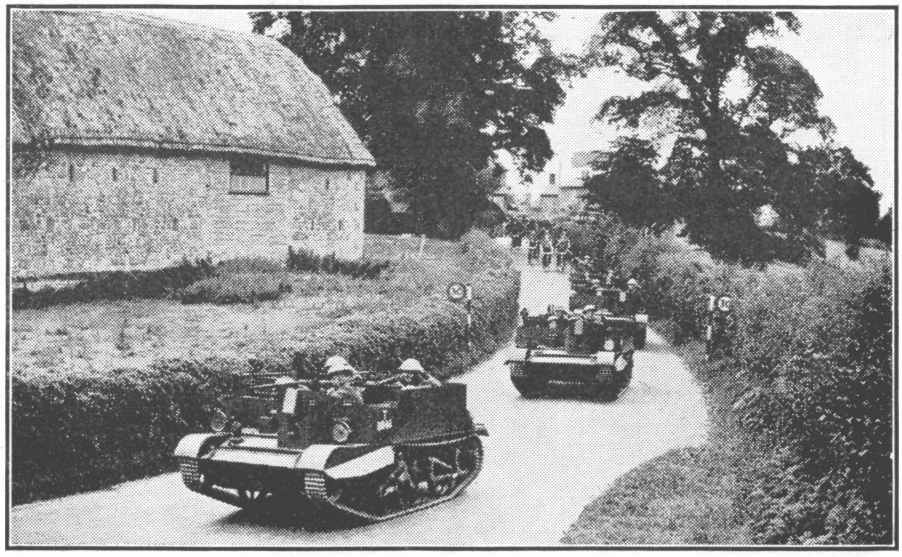
The Light Tank is usually a vehicle of some 10 tons, carrying two or more heavy machine guns and having speeds ranging from 30 miles an hour upward; some of the latest models are credited with 50 miles an hour on good ground. It is with this type that the cavalry horses have been replaced, and the work of the light tank units is exactly that of the cavalry arm in earlier wars, although of course the range of their operations is much greater, due to the fact that they do not have to halt to water and feed the chargers at reasonably regular intervals.

Nor do they form line and charge as in the spectacular battles of the past. The whole secret of making the best use of their mobility is to take them *round* an obstacle rather than launch them *at* it. With their speed is combined extreme flexibility of manœuvring; they can spin round like tops. Consequently, if confronted by a battery, the light tank can usually make a swift change of direction and attack the guns from a flank in less time than the gunners need to swing their pieces round to face the new direction of the attack.

In the use of the light tank the British cavalry has more than maintained its ancient traditions. To quote one example only, the 12th Lancers performed notable feats of valour and skill in covering the retreat to Dunkirk. They were detailed to close the gap that had occurred between the Belgian troops north of Ypres and our own 3rd Division, and so far as possible delay the German advance. To effect this the Lancers provided covering forces while the Engineers worked to destroy the numerous bridges over the streams and canals of that region. So well was this work timed that in one case the dust of the explosion from the destroyed bridge had not cleared before German motor cyclists, followed by lorries packed with infantry, swept down the road, and the looks of surprise on their faces showed that the destruction of the bridge and the presence of the Lancers, who opened a deadly fire, were alike unsuspected. A similar delaying action was fought with great success by another squadron at Dixmude; while the last stand of the covering force at Nieuport itself was carried out by the 12th Lancers with a few larger tanks and a detachment of the Royal Artillery.

The high speed and extreme manœvrability of the light tank makes it an ideal fighting unit to co-operate with aircraft and it is often used in such work.

Turning now to the Bren gun carrier, this is not in itself a fighting vehicle, although of course the Bren guns can be fired from it while it is in motion. Its function is to transport the machine gunners quickly to the nearest possible position to that in which they are to come into action, and to stand by while they are in action, ready to transport the fighting men to a new position when a change is required. The underlying idea is of course to concentrate the greatest possible degree of fire power with the utmost speed at a given point. This idea is by no means new; it does not even belong to this century. In Wellington's day the Army had Troop wagons; light four-wheeled carts, drawn at a gallop by four horses, each (Continued on page 234)



Bren Carriers and Cyclists on their way to the objective.

Supercharging the Pilot for Stratosphere Flights

Tests with Lockheed Interceptor Fighter

By Andrew R. Boone

A TWIN-ENGINED Army Air Corps interceptor-pursuit aeroplane, the P-38, made history a few years ago in the violet-hued stratosphere above Union Air Terminal, Burbank, California.

With its two 1,100 h.p. Allison engines opened to nearly full throttle, the first of the new type sky fighters to come off the Lockheed production line is reported to have winged through space faster than any aeroplane had ever been flown before. Its actual speed in level flight is held to be a military secret.

At the controls was Milo Burcham, 36-year-old Lockheed test pilot, who a few years ago was rated as one of the country's ace stunt fliers. Over a shortwave set he radioed to the test engineers at the airport the story of the aircraft's speed-shattering performance, as told by his instruments. In the cockpit a motion picture camera focused on an auxiliary instrument panel photographed air speed, altitude and temperature gauges. On this negative is evidence that *"Uncle Sam"* is not likely to be outspeeded in the air.

In a short time a steady stream of these interceptor-pursuits will be rolling off the production line. The Air Corps has ordered several hundred, and the British Government nearly a thousand of the export version.

Milo Burcham, pilot of Lockheed P-38 interceptor-pursuit, being "supercharged" before making speed tests at six-mile level.

Wearing stiff helmet to protect his head in case of crash, Burcham backs into the cockpit.

For his excursions into the stratosphere for the speed tests, and subsequent service ceiling flights, Burcham was "supercharged," according to instructions from the Mayo Clinic at Rochester, Minnesota. This was done as a safeguard against aero-embolism, or aerial "bends," which are similar to bends experienced by deep sea divers who come to the surface too fast. In the case of the pilot they are likely to occur when he climbs above 30,000 ft., too fast.

The mission of the interceptor-pursuits is to defend against bombing attacks and to reach their positions above the bombers in the shortest possible time. With the new fast bombers capable of flying at 30,000 ft. and higher, and the advent of pressure cabins, it means that the pilots of the interceptors must be prepared to go up to 33,000 ft., 34,000 ft. and higher. That is the reason the Army Air Corps representatives watched with keen interest the performance of the P-38 in the stratosphere, and is why Burcham was "supercharged" for his flights.

Medical authorities point out that the stratosphere is lethal territory for the pilot who is not prepared for it. Man, it is explained, is put together for habitation of the lower atmospheric levels; and unless artificially supplied with oxygen he cannot long survive above 18,000 ft. He has an even more serious weakness. When the pressure is lowered, the gases in his system expand; and the less the pressure the greater the expansion. The greater the speed with which this pressure is reduced—such as gaining altitude at the rate of a mile a minute—the greater is the danger to him, unless he has taken the precaution to "supercharge" or decompress himself in advance.

One of the gases in the human body is nitrogen. When this expands t tends to form bubbles in the tissues and blood stream. This condition is known as aeroembolism. It can produce temporary paralysis and even unconsciousness, and is primarily dangerous when a pilot reaches an altitude of 30,000 ft. or above. In some persons it may manifest itself in a mild form at altitudes as low as 20,000 ft.

Assistants remove parachute from weary pilot following an hour's flight above six-mile level.

In one of these fast attack machines, capable of diving at more than 600 miles an hour, fliers declare that temporary loss of consciousness might prove fatal, as the aircraft is likely to dive into the ground before the pilot could recover sufficiently to pull it out.

The Mayo Clinic at Rochester, Minnesota, during the past two years has conducted several hundred experiments in its low-pressure chamber, in which any altitude can be simulated, in studying the effect of various altitude levels on the human body. The Army Air Corps at Wright Field, Dayton, Ohio, also has conducted such experiments, and from time to time has sent officers to the Mayo Clinic. However, as far as is known Burcham is the first pilot to try out "supercharging" for high altitude work in one of the interceptor-pursuit type aeroplanes.

The speed at which these craft can reach the stratosphere makes "supercharging" of the pilots imperative, according to Mayos. It is a comparatively simple process. It is done by inhaling pure oxygen for a period of 30 minutes while exercising. The combination of exercise and oxygen eliminates the nitrogen from the body. In a period of 30 minutes the nitrogen content is reduced by approximately 50 per cent. which the Mayo experiments have revealed as being below the aeroembolism danger point.

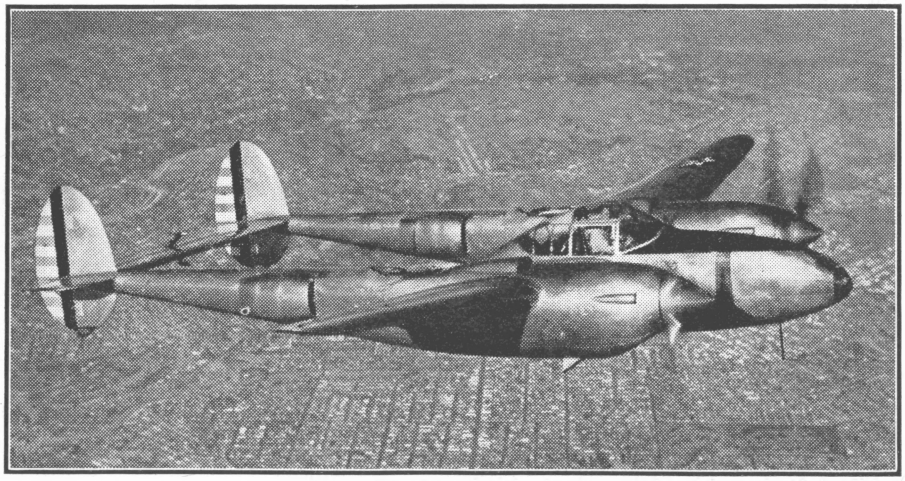
The reason "supercharging" of pilots has not been a serious problem until now is the fact that in the slower machines the pilots, who started breathing oxygen at the take-off of a trip into the extreme altitudes, were usually pretty well "supercharged" by the time they reached 30,000 ft. Not so in the fighting aircraft that can climb into the stratosphere in about the time it takes the average person to walk around the block.

Burcham was examined before and after his stratosphere flights by Dr. Vincent P. Flynn, Pasadena physician and flight surgeon for the Army Air Corps detachment at Long Beach. He was found to be in excellent condition, the doctor noting only a sub-normal blood pressure, which he said might have been due to breathing an excessive amount of pure oxygen during the several weeks the tests were in progress.

Before he was permitted to fly the P-38, Burcham was sent to the Mayo Clinic at Rochester for a thorough head-to-toe check-up, and to gain experience in the clinic's low-pressure chamber. On one of the trips up to 35,000 ft. he lost consciousness in 30 seconds while going through the motions of bailing out of a machine without using oxygen. It was a convincing demonstration, according to Burcham, that a pilot's oxygen supply cannot be interrupted in the upper altitudes without possible fatal consequences. He had had no warning, he said, that he was on the verge of collapse.

On the advice of the Mayo Clinic, Lockheed built a special decompression room adjacent to its test hangar at Union Air Terminal. The equipment consists only of bare essentials—a stationary bicycle, oxygen cylinders, inhalation apparatus, complete set of oxygen fittings, and emergency oxygen flasks.

To decompress or "supercharge" himself the pilot dons the inhalation apparatus, consisting of a nasal face mask, breathing bag and rubber tube connected to the oxygen cylinder: turns the valve to start the flow of oxygen, and then begins to pedal the bicycle. The pace set is equivalent to walking at the rate of $2\frac{1}{2}$ miles an hour, and is maintained for 30 minutes. To prevent becoming overheated the pilot exercises in light clothes.



Lockheed P-38 interceptor fighter in flight. Several hundred of these machines will reach England during the next few months.

From the time he starts breathing oxygen in the decompression room, however, until he has nosed his aeroplane back to lower altitudes, the pilot cannot take a breath of "fresh air." One whiff of air containing nitrogen

(Continued on page 234)

Notes on East Anglian Express Running

By R. A. H. Weight

(Note: The operating details referred to in this article describe pre-war practice)

THE Great Eastern Railway, as it was called from 1862 until amalgamated within the L.N.E.R. group in 1923, possessed two main routes from London to Suffolk, Norfolk, etc., one by way of Colchester and Ipswich, the other through Cambridge. In addition there are numerous branches and cross-country links. For the most part the country traversed is of an agricultural and sparsely populated type; really large towns being few. At any rate as regards passenger business the coastal resorts provide a large and profitable traffic only at the height of the summer season when an entirely different timetable is necessitated at week-ends. In the circumstances a reasonably good express train service was provided all the year round. If their schedules appeared leisurely by comparison with modern speeds elsewhere, it should be borne in mind that gradients, curves and service slacks are numerous; allowable maximum locomotive length and weight is restricted by bridge, turntable and siding capacity; loads are usually heavy on account of the generous number of through portions conveyed, and intermediate stops are often frequent. Other recent hindrances are mentioned later.

"The East Anglian" at full speed, locomotive No. 2859 "East Anglian." Photograph by courtesy of the L.N.E.R.

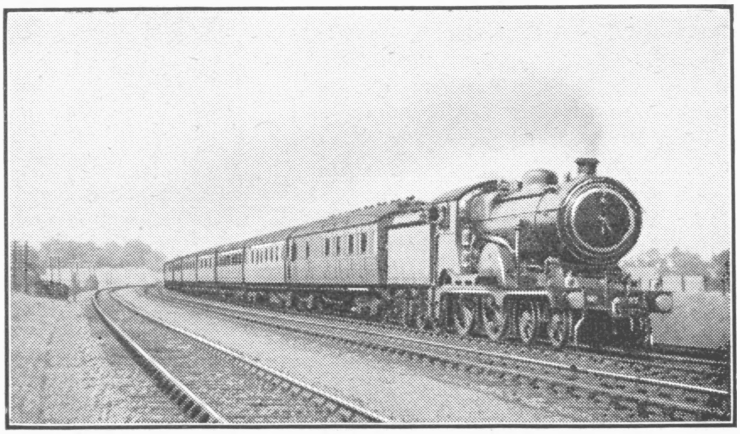
During the last 40 years only three express locomotive types have been evolved for the G.E. services; each has developed into a numerous class and been eminently successful.

First of these were the neat 7 ft. 4–4–0s with round top fire-box, now L.N.E.R. classes "D15" and "D16"; the pioneer engine was completed in 1900 in time to be shown at the Paris Exhibition of that year. Exceptionally it was named *"Claud Hamilton"* in honour of the company's Chairman, and ever since all locomotives of the type have been known as "Claud Hamiltons" or else, for short, just "Clauds." The numbers started at 1900 and gradually worked back to 1780, there being plenty of blank lower numbers. By 1911, the number of these stout "Clauds" built had reached 111. After 1903 a boiler with Belpaire fire-box became standard for new and refitted engines. Heating surfaces were slightly increased, superheating being gradually added. In 1923 the last 10 built, known as "super-Clauds," numbered 1780-9, were slightly larger superheated engines with Belpaire fire-box. Later some of the G.E.R. series were again rebuilt under Sir Nigel Gresley's direction with a larger superheater boiler, round top fire-box, new cab and raised footplating in front of the splashers. These rebuilds are classed "D16/3." The cylinders, 19 in. by 26 in., and the boiler pressure, 180 lb. were unaltered, but the boiler horsepower went up from 826 to 1032. All the "Clauds" variously reboilered are still in service, though now chiefly on secondary duties, and all but three are painted black. The G.E. passenger engine colour was a pleasing shade of ultramarine blue, lined in red.

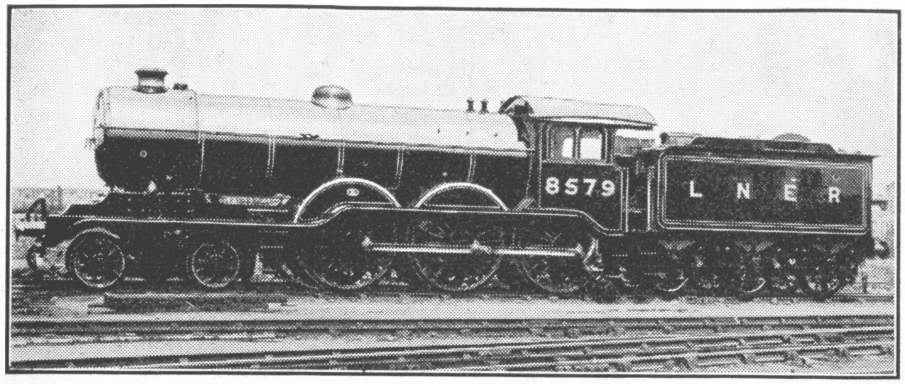
The second design was the Stratford 4–6–0 first seen in 1912 and multiplied in later years, now class "B12." In order to be usable on all principal routes and coast branches they were distinctly on the small side for 4–6–0s, even 30 years ago, the adhesion weight on the driving axles being only 43½ tons; nevertheless they proved capable of excellent work as regards both speed and haulage. In the hands of expert drivers and firemen their nightly exploits in all weathers with the down Harwich boat expresses ensured them a worthy niche in British locomotive history. With 400 tons and more behind the tender, a hard road and many slacks, there was often not a moment to spare in keeping the 82-minute timing over 69 miles. These good old engines are still generally known as the "1500s," although on account of the L.N.E. renumbering scheme having added 7,000 to all existing G.E. numbers 16 years ago, they now carry 85xx numeration. There is no 8506 owing to severe damage in a collision many years ago; otherwise all up to 8580 are still running, though on the same lines as the 4–4–0s many have been rebuilt recently. The Gresley rebuilds, class "B12/3" are handsome, efficient and popular engines. The driving wheels 6 ft. 6 in., pressure 180 lb., and cylinders 20 in. by 28 in. remain as before. The important modernisations include larger boiler, more superheat, larger grate and much longer valve travel.

The third type was introduced by the L.N.E.R. in 1928 and developed in recent years, being the powerful "B17" or "Sandringham" 3-cyl. 4–6–0 named class, incorporating the now familiar Gresley arrangement for actuating the inside cylinder steam distribution off the outside valve motion. Owing to the necessity for keeping the length within certain G.E. turntable limits, a small 6-wheeled tender was fitted and the drive divided. The boiler pressure is 200 lb., total heating surface 2,020 sq. ft., driving wheels 6 ft. 8 in., total weight in working order 130 tons, compared with the 109 tons of the "B12/3."

In 1931, when the subject of acceleration was under review and a 65-minute non-stop service between Liverpool St. and Cambridge was in contemplation with a load of, say, five corridors, it was decided to make a test run with an ordinary train to ascertain what margin there would be as regards both timing and load. At the same time the objective was to see if, without immoderate running, the 55¾ miles to the university town could be covered in an hour. All the regular fast trains called at



Hunstanton Express hauled by "Super-Claud" No. 8787, painted green for working Royal Trains and built by the L.N.E.R.



The rebuilt 4-6-0 that figured in the fast Cambridge buffet express run. Class "B12/3." Photograph by F. Moore.

least at Bishops Stortford, where the halt would have nullified the object in view; therefore at my suggestion, made during a chat with the Locomotive Running Superintendent, the trial was staged with a Sunday excursion which was booked non-stop, though in about 80 min. So one grey Sabbath morn we set off with a load of eight ex-G.E. corridors weighing 222 tons empty or nearly 240 full, behind 2800 *"Sandringham,"* the passengers whose half-day fares provided about three miles travel per penny having no knowledge that they were perhaps to share in the making of railway history!

Immediately after the start comes the steep 1 in 70 32-chain Bethnal Green rise; then no sooner had we got going beyond the summit than came a bad slowing over an underline bridge under repair. An additional p.w. slack occurred also among the normal succession of slowings through Hackney Downs, Clapton and Coppermill Junctions. At the best this is a tortuous and congested exit from London. The ascent of the long, gradual rise through the Lea and Stort valleys was hampered by a check due to signals out of action near Ponders End, and *"Sandringham"* was not steaming too well. Still, a clear road was now obtained, and some lively travelling ensued. Up the northern part of the 1 in 400 speed ranged from 62½ to 66; then, following a service slack to 30 past Bishops Stortford, the 1½ miles up at 1 in 124-107 to Elsenham produced a drop only from 58½ to 53 m.p.h., while on the subsequent stages of broken, curved descent we travelled under easy steam at 71-77-70 m.p.h. Without the untoward slowings, the run certainly would have been made in an hour; actually to a final stop at the north end of the vast single platform at Cambridge the time was 62½ min.

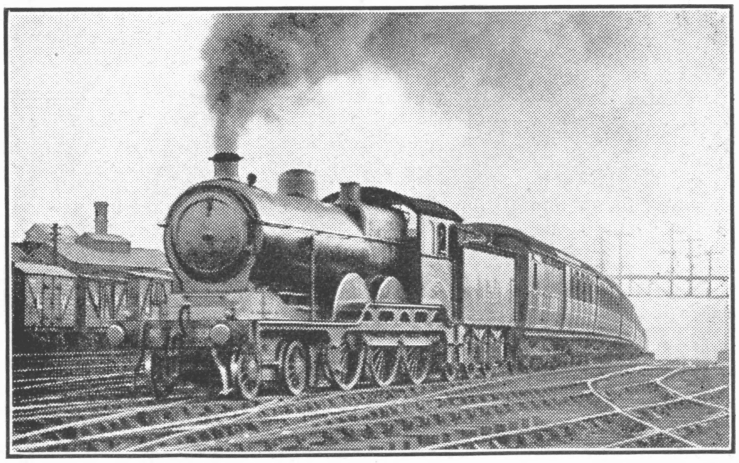
An interesting comparison is afforded with a run in 1938 when the 65 min. non-stop daily service was operating, worked as usually on this occasion by a "B12/3," No. 8579, which happened to be the first Gresley 4–6–0 rebuild. The load of five modern corridors including buffet car weighed 165 tons gross, and 8579 ran ahead of time throughout. Speed rose to 68 on the level or slightly rising grades before Broxbourne, with nothing less than 64 up the 1 in 400 beyond. Some of the point-to-point times along here were rather better than achieved by the bigger "B17" under test, which was perhaps not surprising in view of the disparity in load. The minimum of 50 at Elsenham summit was less than 2800's, but the ordinary express was now well before time and nothing over 70 was logged on the following descents. Cambridge was reached practically unchecked, apart from service slacks, in 62½ min., so that as the start had been a minute late the arrival was easily 1½ min. early. These "Cambridge specials" were in addition to the popular buffet expresses from King's Cross, and did not last long owing to lack of patronage and pressure of freight traffic on the tracks. As regards speed and load they were a very different proposition from the customary slower but vastly heavier trains that are handled with equal success.

The other main line is much more steeply graded and it carries a heavier express traffic. Over the difficult branch and main route from Southend-on-Sea to London, *"Sandringham"* made a remarkable test run one morning with 10 on, 295 tons full. One of the principal business expresses was held up so as to start from the Southend suburb of Prittlewell 12 min. late with a view to seeing if it were possible to get to Liverpool St. to time. It was almost done, as the 41 miles were covered in 45½ min. compared with 57 booked! Grand work was done along the branch with its 1 in 100 ups and downs, such as the minimum of 45 m.p.h. at the top of the 4½-mile Ramsden Bellhouse bank; or the maxima of 79 and 73 quickly attained downhill. On the main line, after slacking to 22 past Shenfield Junc., 2800 recovered to 35 up the immediately succeeding 1 in 136 to Ingrave, touched 78 at Harold Wood, braked to 62 round Gidea Pk. curves, then quickly worked up to 74 near Chadwell Heath where populous suburbs commence. The speed was exceptional right into the London area, but service slowings were carefully observed. Luckily there were no signal checks on this busy line as special arrangements had been made to ensure a clear road.

For a number of years before the war, delays were frequent and acceleration of timings more or less impossible on account of heavy engineering works at various points in the first 20 miles from Liverpool St. All are part of a scheme to facilitate the handling of the enormous suburban and residential traffic. Widenings as well as colour light signalling installations have been completed north of Romford. Nearer London in connection with local lines' electrification and tube extension plans, extensive track alteration and station reconstruction works were only partially completed when operations were suspended for the duration of war.

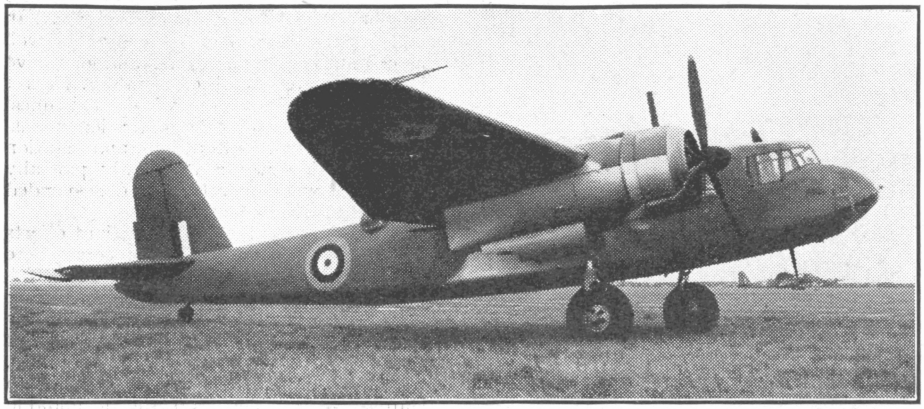
Some of the drivers made valiant efforts with quite heavy trains to recover time lost by these delays. An unrebuilt "B12," No. 8534, with 13 corridors, 383 tons tare or 400 gross, was badly slowed in the 3½ miles between Stratford and Ilford northbound, but accelerated to 52 uphill, mostly at 1 in 400, over the 7 miles to Harold Wood. Then up the formidable Brentwood bank—over 2 miles at 1 in 103, a shorter length at 1 in 85, followed by a strip at 1 in 155 to Ingrave summit—the comparatively good minimum was 30 m.p.h. Service slacks at Chelmsford, Witham, Colchester and before Ipswich required easings to 50-40 m.p.h., but notwithstanding the undulating nature of the road the 48¾ miles from Ingrave to Halifax Junc. Ipswich occupied only 46¾ min. The highest speed touched was 74 between Ingatestone and Chelmsford and the uphill work was bright, so that the arrival in Ipswich in 85 min. was punctual despite quite 6 min. delays. The net time was thus 79 min. for the 68¾ miles, and the driver said the engine "had never been pushed."

Seventy-nine minutes was the fastest schedule in 1939 to pass Ipswich with a minute more to stop. The former timing applied to the enterprising *"Eastern Belle Pullman,"* half-day excursion train *de-luxe*, consisting entirely of Pullman cars, which in summer ran from Liverpool St. to various coastal resorts on weekdays, except Saturdays, and to Clacton each Sunday. The timings provided some of the longest and fastest G.E. section runs, but even so there was quite a considerable margin for time recovery on occasion.



Continental Express topping Bethnal Green bank. Unrebuilt "B12" 4-6-0 No. 8533. Photograph by F. R. Hebron.

"B17" 2807, *"Blickling,"* with 9 cars, 335 tons empty, 355 full, for instance, on a non-stop timing of 150 min. over a most difficult route to Gt. Yarmouth, 121¾ miles, topped Brentwood bank at the fine minimum with this load of 39½ m.p.h. Signal and p.w. delays cost 5 min. yet the arrival in Yarmouth was 8 min. early. So frequent and steep are the successive ups and downs of the East (Continued on page 234)



A Blackburn "Botha" I General Reconnaissance and Torpedo Bomber for the Royal Air Force. Photograph by courtesy of Blackburn Aircraft Ltd.

AIR NEWS

Boeing Flying Boats for British Airways

The first of the three Boeing 314A flying boats for British Airways has been delivered to the company and flown across the Atlantic. It has been named *"Bristol,"* and the second, now being test flown in the United States, will be called *"Berwick."* The name chosen for the third boat has not been announced.

These fine 4-engined flying boats are to be known as "B" class in British Airways' fleet. A description of them was given in the *"Air News"* pages of the May 1941 *"M.M."*

British Test Pilot Honoured for Gallantry

Mr. P. G. Lucas, senior test pilot for Hawker Aircraft Ltd., has been awarded the George Medal for gallantry while testing a new aeroplane. During the flight part of the cockpit cover became detached and was lost, and caused a crack to develop in the fuselage skin, with the result that the pilot found himself hung over a hole in the cockpit. Instead of baling out he remained at the controls and landed the machine safely, thus making it possible for the damage to be studied and its cause investigated.

First New Zealand Fighter Squadron Ready for Action

The first all-New Zealand fighter squadron to be formed in England under the Empire Training scheme has completed its operational training and soon will be moved to a "front-line" station. The pilots will fly "Spitfires" bought by funds subscribed in their native country.

The 24-year-old Squadron Commander, is a native of Dannevirke, and learned to fly at the Dannevirke Club, Hawke's Bay. In 1935 he worked his way to England as a ship's writer at a shilling a day to join the R.A.F. A fighter pilot of great experience, he has served with the Fighter Command's famous Burma "Hurricane" squadron, and for a time he was a Flight Commander in a Czech fighter squadron.

The all-New Zealand squadron's two Flight Commanders, both red-headed, joined the R.A.F. in 1937. One often took part in the battles behind Dunkirk, in which he destroyed a "Ju.87" and shared in that of another. On a first patrol his squadron ran into about 50 enemy aircraft and shot down 11 of them. On a later occasion he was himself shot down when his squadron had gone up to intercept a large party of Nazi bombers, heavily escorted by fighters, heading for England. His flight became mixed up with 50 "Me.110s," and he had his controls partly shot away by cannon fire. His machine dived from 20,000 to 5,000 ft. before he could jerk open the jammed hood and bale out. He came down near Saffron Walden.

The other Flight Commander served in France with a bomber squadron of "Battles" before being transferred to fighters.

One of the Sergeant pilots has had his share of thrills of another kind. He was a member of a party of four young adventurers, three from New Zealand and the other a South African, who sailed round the world in a small ketch about a couple of years before the war, taking 15 months to complete the trip.

Pan American Airways Service to Singapore

Pan American Airways are now operating their San Francisco-Manila service to Singapore in alternate weeks. The trip from Manila to Singapore takes 6½ hrs. by air, as compared with almost a week by ship. The first regular flight over this extension of the Manila service was made by the company's flying boat *"California Clipper,"* and when a few miles off Singapore the big boat was met and escorted to its destination by five R.A.F. Brewster "Buffalo" fighters.

* * * *

The first Bristol "Beaufort" Bomber to be built in Australia is now under test.

Building 50 "Liberator" Bombers a Month

One of the types of American bombers being flown across the Atlantic to Britain is the Consolidated "Liberator." Many more of these big four-engined aircraft are to be built, and two huge, almost identical factories to be erected immediately will be engaged entirely in turning out a total of 50 "Liberators" a month! One factory at Fort Worth, Texas, will be run by the Consolidated Aircraft Corporation, and the other, at Tulsa, Oklahoma, will be operated by the Douglas Aircraft Company, Inc. Aircraft parts and sub-assemblies will be supplied to both plants from a third new one that is to be built by the Ford Motor Company at Ypsilanti, in Michigan.

The aircraft will be mass-produced by line assembly methods in which the machines will move at timed intervals from one crew to the next, each crew doing a particular job on them. This progress line will extend along one side of the main assembly plant, a huge building 4,000 ft. long and 320 ft. wide, and the parts and sub-assemblies from the Ford factory will be delivered to the various crews by special trucks moving over cross-tracks to the crew positions.

When in full operation the Fort Worth and Tulsa factories will employ a total of about 10,000 workpeople.

Defeating the Night Raider

During recent months there has been an encouraging increase in the number of enemy raiders brought down over this country at night, largely owing to the greater efficiency and total of our night fighters.

The anti-aircraft gunners also have done well. A hint of a device that is being developed to greatly help the gunners was revealed by the Hon. C. G. Power, Canadian Minister of National Defence, when calling recently for 2,500 Canadians to join the R.C.A.F. for training as radio mechanics. After training the men will be sent to Britain and stationed at key points all over the country, where by means of small, modern radio sets they will be able to detect aircraft in the air and to direct anti-aircraft fire with deadly accuracy.

A Cuban Navy crew in front of their Howard monoplane "Teniente Menendez" at the U.S. Coast Guard Base at Floyd Bennett Field, Brooklyn, N.Y. They were about to take off for Havana, Cuba, on the last stage of a recent 20,000 mile goodwill tour of 22 American republics. Photograph by courtesy of Curtiss-Wright Corporation, U.S.A.

Helicopter Hovering Flight

The experimental Vought - Sikorsky helicopter VS-300-A recently made a notable flight at Stratfield, Conn., U.S.A., when after a vertical take-off it hovered over an area of less than an acre for 65 min. 14½ sec. It then made a perfectly vertical descent and landed without any ground run. Igor Sikorsky was at the controls.

The Vought-Sikorsky helicopter has a three-bladed main rotor 28 ft. in dia., above the forward part of the fuselage, and three two-bladed rotors 7 ft. 8 in. in dia. carried above the fuselage stern. The engine of this strange looking machine is a 90 h.p. Franklin, and the power is transmitted through a multiple belt drive.

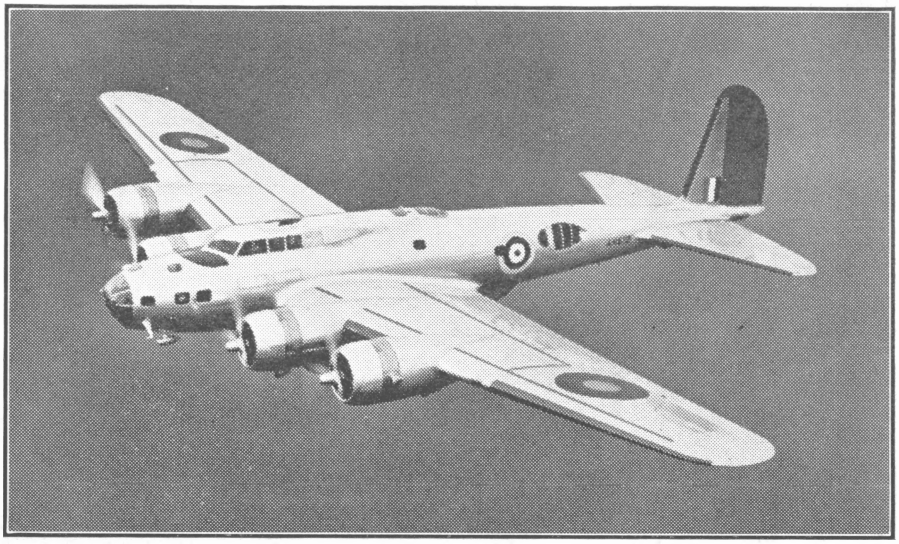
Hard Hit But Safe Home

The captain of an R.A.F. heavy bomber brought it home from Kiel the other night with only one slight casualty among the crew, although the machine had been so severely damaged by anti-aircraft fire that eventually both engines had cut out. When the bomber arrived over the target it was met by fierce anti-aircraft fire and many searchlights. One cone of light caught and held the machine, but the captain kept over the target and successfully bombed his objective.

"Shells were bursting all about us," he reported afterwards. "We could hear them and we could smell them—the same smell you get on a busy shooting range. Mingling with it was the smell of petrol when one of the tanks was hit. By diving and climbing and making sharp turns we managed to escape. At one moment we got into a spin but pulled out, though not before the dinghy, in its box, had fallen several feet and hit the navigator in the back. After we had got clear we had to use the stars to guide us. We were caught and fired on again over another town. Later, we were heavily attacked from the ground for the third time, but managed to reach the English coast.

"Our troubles were not over, One engine cut out when our height was 1,800 ft. After a few minutes it started again, and enabled us to climb before it spluttered and died away altogether. Then our other engine cut out. I saw trees only 20 ft. ahead, but I was able to avoid them and land. We had one casualty—the navigator had a slight cut in the head.

"I found that most of our starboard flap had been shot away. As a souvenir I have kept a piece of it—just a bundle of fabric which the wind had tied into 18 knots."



One of the Boeing B-17C "Flying Fortress" bombers for the Royal Air Force on a "check-out" flight before delivery. Like recent "Flying Fortresses" built for the United States Army Air Corps, it is specially equipped for high-altitude operation. The photographs on this page are by courtesy of the Boeing Aircraft Company, U.S.A.

"Lysander" to the Rescue

Military units are most enthusiastic in their praise of the R.A.F. Army Co-operation squadrons.

For instance, a small party of "Aussies" have sent a "round robin" of grateful thanks to a "Lysander" pilot who helped them at Giarabub, where they had become separated from the main attacking force and were undergoing withering fire from an enemy outpost. Their position was perilous, as their comrades did not know of their difficulty. Things looked black, until a corporal hit upon the bright idea of signalling their whereabouts to the R.A.F. reconnaissance aeroplane, a Westland "Lysander," that was "spotting" for the artillery. This they did by flashing a hand mirror in the sun.

Very soon the pilot caught the flash, and acted quickly. In a short time he had scribbled a note giving the party's position and had dropped it on a battery of Australian field guns. The enemy outpost was speedily silenced, and the stranded Aussies were relieved.

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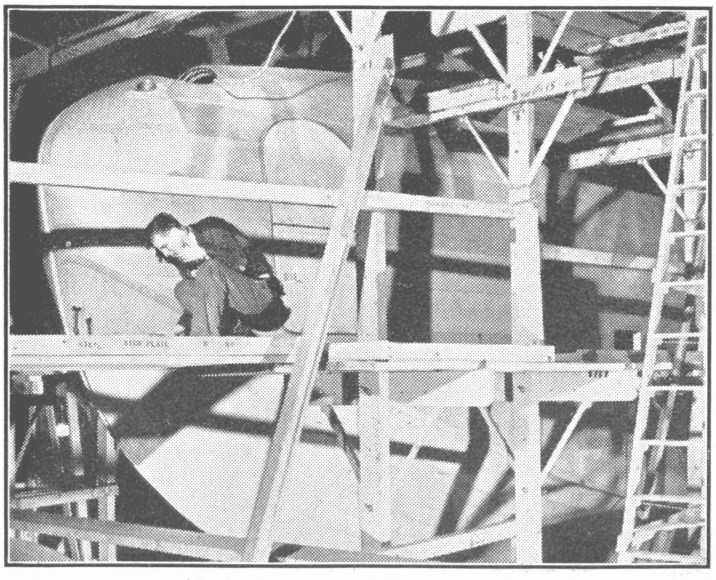
A Negro squadron, to be named 99th Pursuit, is to be formed in the U.S. Army Air Corps.



At work on the bow of one of the new 42-ton Boeing 314A "Clipper" flying boats. The bow is still encased in the scaffolding of the main hull jig.

Canada-United States Air Services

An agreement completed recently between the Governments of Canada and the United States, and effective until the end of next year, authorises the introduction of an air passenger and express freight service between Lethbridge, in Alberta, Canada, and Great Falls, in Montana, U.S.A. The service will make possible an uninterrupted airway from the Yukon to South America. Alberta will become an important part of this airway, as at Lethbridge passengers will transfer from United States air liners to those of Trans-Canada Airlines, which will convey them to Edmonton, in the same Province. There they will transfer to other aircraft for the long flight to White Horse, Yukon. The construction of a chain of seven airports along this Edmonton-Yukon air route will be completed this summer.

The agreement between the two countries also includes plans for the extension of Trans-Canada Air Lines' Toronto-Windsor service to Detroit, U.S.A., and the operation by that company of a non-stop service between Toronto and New York. American air line companies will make connection with Trans-Canada Air Lines at Moncton, New Brunswick, as well as at Lethbridge.

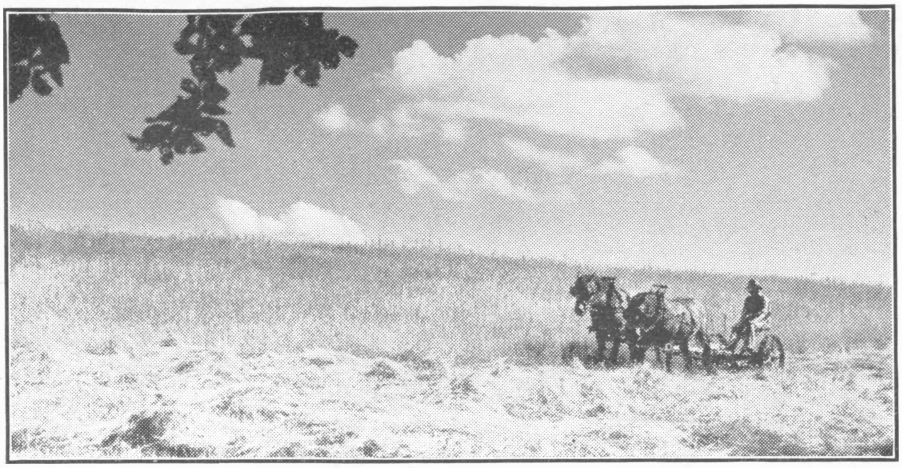
Big Lockheed Air Liners for Pan American Airways

Nine 4-engined air liners which it is claimed will be the largest civil landplanes ever built have been ordered by Pan American Airways. There are conflicting reports as to the Company granted the order, but the latest information is that the U.S. Office of Production Management has issued a certificate to the Lockheed Aircraft Corporation authorising that firm to build the machines.

The new air liners will have an all-up weight of 43 tons, and will carry 50 to 80 passengers. Their four powerful engines will give them a top speed of more than 300 m.p.h. and a cruising speed of 250 m.p.h. Flying at 20,000 ft. or so they will be able to cross the Atlantic in 10 hrs.

* * * *

Five "Atalanta" 4-engined monoplanes of British Airways have been handed over to the Royal Air Force. They were put into service by Imperial Airways in 1932.



"Haymaking"—A summery scene photographed by W. Barr, Birkenhead.

Photography

Disappointments and How to Avoid Them

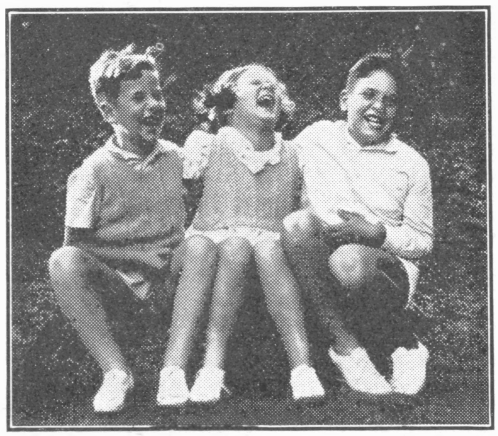
EVEN with the utmost care and plenty of experience it is inevitable that a certain number of our photographic efforts will turn out unsatisfactory. We have all had such results, and have known others who have had them too. One of the first steps towards preventing such failures, is to learn their cause, so that we may be on our guard. I propose therefore to draw attention to a few of the most common causes of trouble.

Many films are spoiled each year through light fog caused when loading the spool into the camera. The usual result of such fogging is a blurred area running down each side of the print, but sometimes it takes the form of fan-shape radiations extending from the edges to the centre of the print. This latter type of fogging, however, may also be due to a badly fitting camera back. As long as the backing paper with the film inside it is tightly rolled on the spool no light can creep in at the edges, especially as they are pretty well covered in by the ends of the spool. But if in loading or unloading the camera the paper is allowed to run slack, it is easy for light to enter at the open edges.

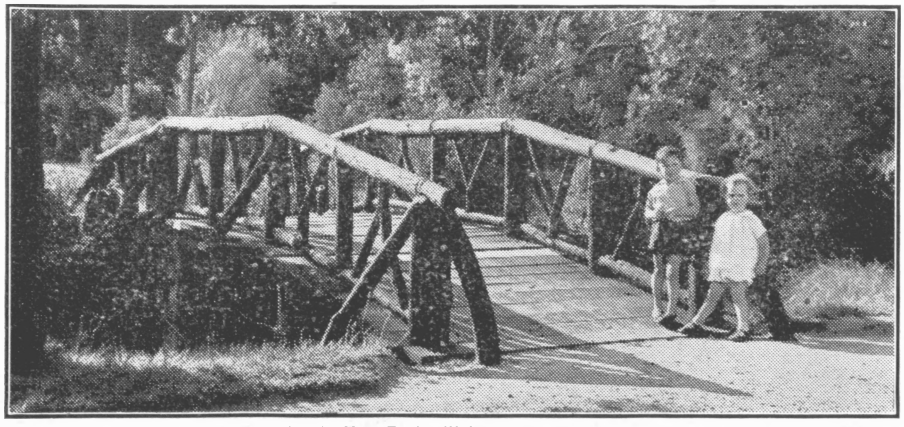
When winding the beginning of the paper on to the empty spool, and when winding off the end of the paper after the last exposure, the thumb should be pressed on the spool that is being emptied. This acts as a brake and keeps the paper taut. Particular care should be taken when the end of the paper flies free from the spool.

A very common defect with roll film negatives is a number of scratch-like lines running the long way of the film, that is in the direction in which the film is wound. These are not always due to the same cause. In most cameras the film runs over two slender rollers that revolve as the film passes over them. At least, they ought to revolve. If they stick, or do not run freely in their bearings, the film will become scratched as it is dragged over them, and it certainly will be badly scratched if the rollers are at all rough. The rollers should be inspected periodically therefore to ensure that they are clean and revolve easily. In some cameras the film passes, not over rollers, but over two fixed smooth surfaces. Here again, roughness or grit will cause trouble.

Another cause of longitudinal scratches arises only in the case of a folding camera. If the back of such a camera is removed while the bellows and lens front are pushed back, it will be seen that, as a rule, the folded bellows actually press against the surface of the film when it is in position. Sometimes the mount of the lens may also touch the film. It is very evident that there will be trouble if the tender gelatine surface of the film is dragged forcibly over the hard edges of the bellows, or against the metal mount of the lens. Trouble due to that cause can, however, always be avoided if care is taken to see that the film is never wound forward when the camera is closed. The correct procedure is to wind on the film immediately after each exposure; and by adopting this method the photographer will also save himself a lot of annoyance and wasted film due to double exposures.



"They laughed and laughed and laughed." This splendid snap of jolly children is the work of P. Halbrach, Curepipe, Mauritius.



"A summer evening in New Zealand" by L. W. Humm, Geraldine, N.Z.

THIS MONTH'S COVER

For the striking photograph on which this month's beautiful cover is based we are indebted to Ilford Limited. The negative, which is made available by courtesy of Mr. Houston-Rogers, London, was taken on Selo F.P.2 35 m.m. miniature film.

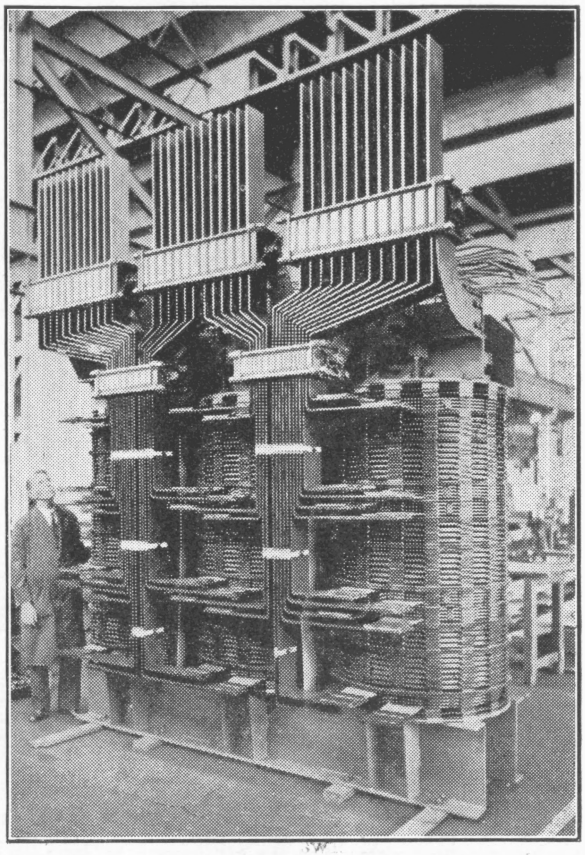
ENGINEERING NEWS

Transformers for Electric Furnaces

Among the many advantages that electric furnaces possess over other types are ease of control of the heat generated in them and of the physical and chemical changes that take place in the metal undergoing treatment. The two kinds in most general use are the "arc" and the "resistance" furnaces, and in most cases they are used in conjunction with special transformers, which reduce the voltage of the available electricity supply to a suitable value and also allow its variation as required between certain limits.

The arc type furnace is used in connection with various metallurgical and chemical processes, and in melting steel and maintaining it at a high temperature during refining and alloying. Essentially it consists of a chamber lined with refractory material, in which heat is generated by arcs formed between graphite or carbon electrodes and the charge of metal placed in the furnace. In a resistance furnace, on the other hand, the heat is generated by resistance units of special alloy, or by the resistance of the charge itself. Some of the larger resistance furnaces have a number of heat zones, the heating units in each zone being separately supplied by low voltage transformers, which in turn are supplied from a main step-down unit connected to a high voltage supply. Means are provided in the low voltage transformers for adjusting the relative temperatures of the various zones.

The successful operation of an electric furnace depends largely on the transformer by which it is supplied with current, and this has to be specially designed for the purpose. A large transformer for use with an arc furnace is shown in the upper illustration on this page. It is a product of The British Thomson-Houston Company Ltd., and is rated at 8,400 kVA. It supplies current at 6,600/246-84 volts, and has interleaved windings. The illustration shows the low tension side of the transformer with the tank casing removed.



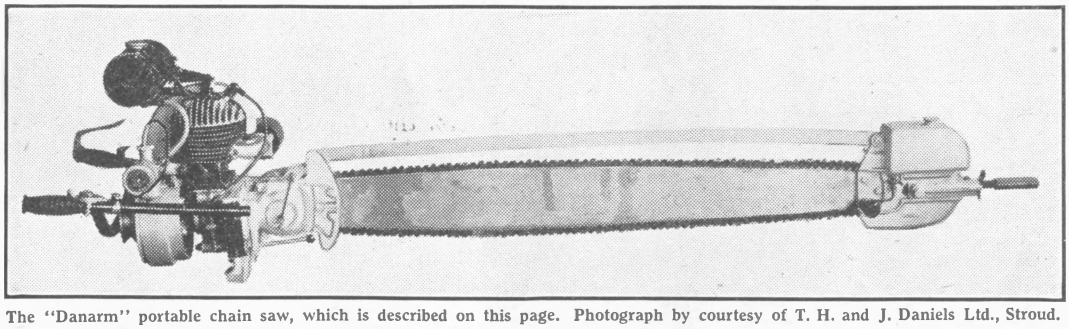
A 8,400 kVA transformer with interleaved windings. It is designed for use with an electric furnace, and is a product of The British Thomson-Houston Co. Ltd., to whom we are indebted for our illustration.

Portable Chain Saw for Tree Felling

The lower illustration on this page shows an interesting portable chain saw, designed for felling trees and cross-cutting. It is manufactured by T. H. and J. Daniels Ltd., Stroud, and consists of a continuous chain saw that runs around head and tail sprockets placed at each end of the machine. One of the sprockets is rotated by a small petrol engine and drives the saw chain at a normal speed of about 1200 ft. per minute. Tests have shown that the saw is capable of cutting through a hardwood log 39 in. in diameter in 3 minutes, while a 24 in. diameter softwood log can be cut through in 50 seconds.

The teeth of the saw chain can be sharpened with a file in the usual way on removing it from the machine and placing it in a vice. A special grinding wheel attachment is provided for grinding the gullets of the teeth. This grinder is driven from the saw engine itself.

The saw chains are manufactured in three standard lengths of 3 ft. 3 in., 4 ft. 1 in. and 4 ft. 10 in. The machine is known as the "Danarm" portable chain saw, and is distributed by M. J. Clubley Armstrong, London, who also collaborated in its design.



The "Danarm" portable chain saw, which is described on this page. Photograph by courtesy of T. H. and J. Daniels Ltd., Stroud.

Bells Made of Glass

In order to save metal German engineers are substituting a glass and metal composition for the metal of telephone bells. Originally glass-lead compositions were used, but as most of Germany's lead supply has to be imported, further experiments were made, and these led to the discovery of a suitable glass-like material that could be manufactured from raw materials available in Germany.

Mobile Electric Generator Stations

A thousand mobile electric generating stations are being constructed for use in timber camps and on railway construction work in Russia. These movable stations will have generating capacities ranging from 2.5 kw., up to 50 kw., the smallest being for use by railway maintenance gangs, while those of from 30 to 50 kw. capacity will be fixed on the running boards of motor vehicles and worked by their engines. A novel feature of the largest generators is that they will be driven by gas instead of Diesel engines.

The New Niagara Bridge

The new bridge that is being built to replace the famous Falls View Bridge at Niagara Falls, which was destroyed by an ice jam in 1938, will have a graceful main arch of 950 ft. span, and will cross Niagara Gorge at a point about 2,000 ft. below the American Falls. There will be a wide promenade on the southern edge of the double roadway, giving a full view of both the American and Horse-shoe Falls. Traffic will be carried by two separated 22 ft. roadways.

The foundations for the new structure, in the face of the Gorge cliffs, will be high above the level of any possible ice-jam of the future.

Mass Production of Buildings

The Government of the United States, having decided to increase the military defences in the Panama Canal area, has had to adopt mass production methods and apply them in providing camps and accommodation for their increased forces. Concrete forms are made of plywood in stock sizes, assembled and numbered, and moved from building to building as fast as the concrete has set. Carpenters then string the roof rafters and move on to the next unit, and after them come the roofers who apply tar and prepare the way for workmen who lay the tiles. While the tiles are being laid the interior walls and partitions are rising into place and plasterers are busy putting on the interior finishes. A coat of paint is applied when the plasterers have finished. The plumbing and electrical fixtures are next installed, and sewage, water, electricity and telephone connections made with the street mains while work begins on roads, walks, drainage and grading. The scheme is an ingenious one and should be successful in practice.

Mass Production of American Bombers

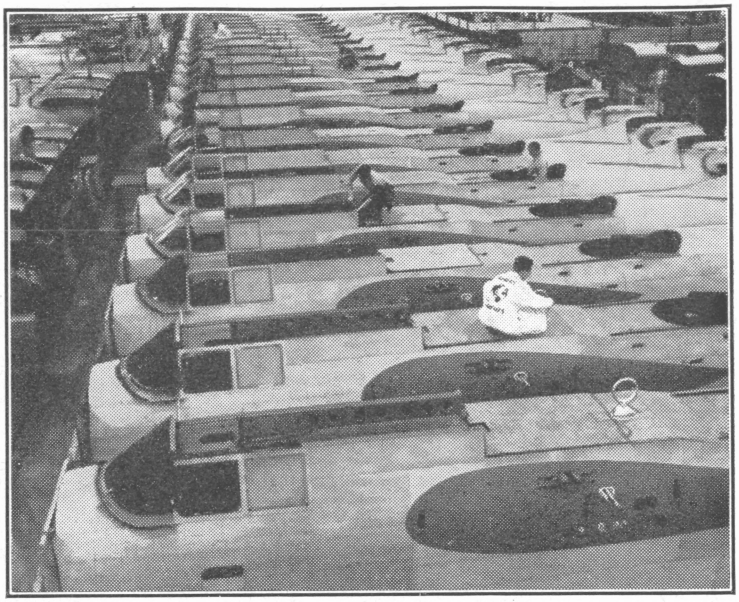
New Technique at Douglas Aircraft Factories

IN the United States the mass production of military aircraft for that country's defence requirements and for Great Britain under the Lease and Lend Act is now in full swing, and every month there is a striking increase in the total of aircraft completed and delivered. This great and growing output has been achieved mainly by enormous expansion of the chief American aircraft factories, and the introduction there of improved and faster production methods.

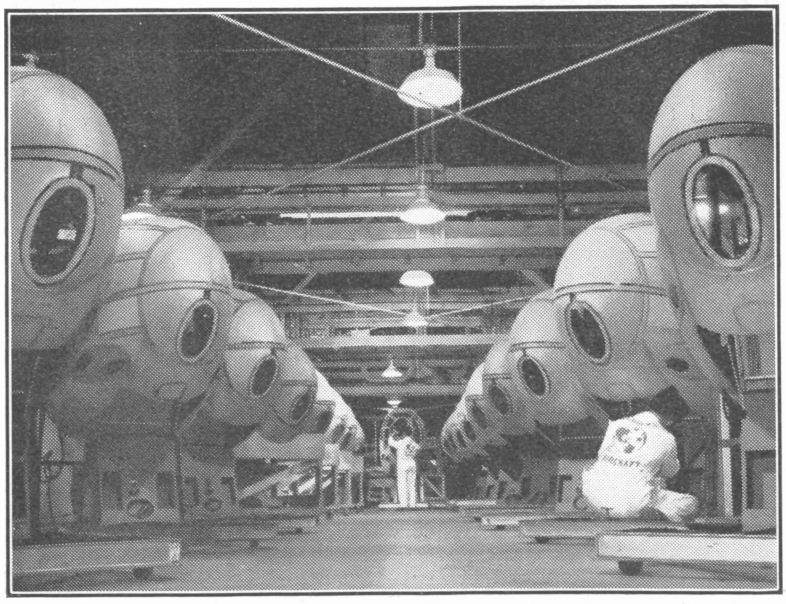
The Douglas Aircraft Company, Inc., of Santa Monica, California, are in the forefront of this immense national effort. Before the armament speed-up came to engage their resources almost entirely in turning out military aircraft, the company were the largest producers of air line equipment in the world. Their commercial machines are operating on air routes in North and South America, China, and Japan; and before the war, were employed by important air transport concerns in Europe.

The story of this famous firm goes back to 1920, when it was founded by Donald Wills Douglas, who had not long completed his training at the United States Naval Academy and the Massachusetts Institute of Technology. Afterwards he had gained valuable practical knowledge by working for several aircraft manufacturers, and through his appointment as civilian aeronautical engineer for the United States Army Signal Corps.

The first aeroplane produced by the Douglas company was a single-engined open cockpit biplane named the "*Cloudster*." It was designed to fly non-stop across the United States, a feat then unaccomplished. The attempt had to be given up owing to engine failure, but useful experience had been obtained. In 1921 the company constructed their first military aeroplane, the DT-1, another single-engined biplane with deep, narrow fuselage and folding wings. Gaining confidence, the company entered into competition for Government orders, and in 1924 began to make aircraft for the United States Army. They achieved a striking success immediately, for three of their machines were flown by United States Army pilots in the first aeroplane flight round the world. Government contracts kept the company fully engaged for many years in producing military aircraft. These were chiefly two-seater trainers and two-seater observation biplanes, but experimental amphibians and flying boats also were produced for the United States Army Air Corps.



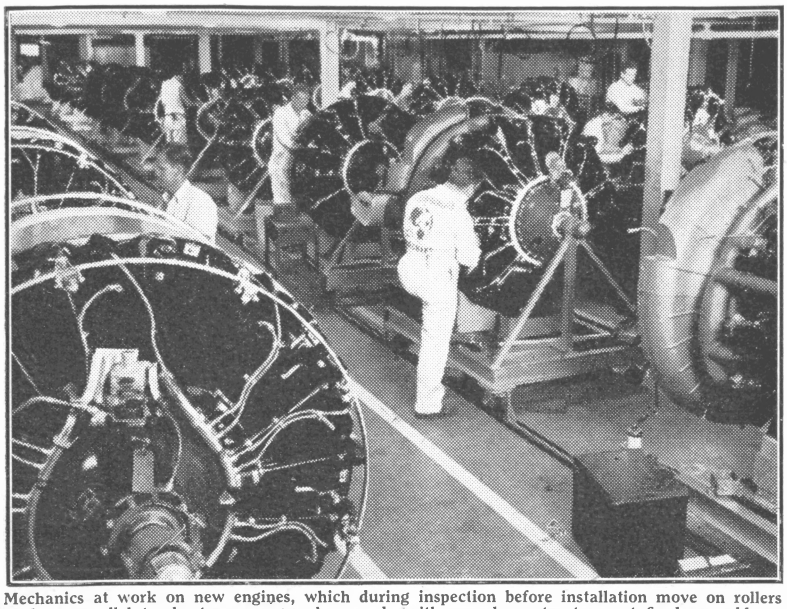
Mass production is beginning. Mounted on rails, the bomber fuselages move smoothly along the assembly line. The illustrations to this article are by courtesy of the Douglas Aircraft Company, Inc., U.S.A.



Not deep sea diving bells, but bomber noses—these units move on wheels down the assembly line.

By 1926 the company were employing 350 people, and their factory at Santa Monica had 65,000 sq. ft. of floor space. In that year Santa Monica purchased an airport, and induced the Douglas company to establish themselves permanently in the city. The firm bought about eight acres of land adjoining the flying field on which to erect a new plant, and in 1929 their new plant at Clover Field was completed and occupied.

Until 1932 the company were engaged almost entirely in producing military aircraft, but in that year they gave serious attention to civil machines. In competition with other aircraft producers they succeeded in obtaining a contract from Transcontinental and Western Air, Inc., one of the big air line companies of the United States, for a fleet of 26 Douglas DC-2 "Transport" 14-passenger air liners. The first "Transport" delivered proved so successful in service that T.W.A. increased their order to 41 machines. Air transport concerns in America and other parts of the world became interested, and by September 1935 a total of 120 of these monoplanes had been ordered. In 1934 a license was granted to Anthony Fokker, the famous Dutch aircraft designer and



Mechanics at work on new engines, which during inspection before installation move on rollers along parallel tracks to converge when ready with aeroplane structures at final assembly.

manufacturer, to produce and sell in Europe the then famous DC-2 "Transport."

The Douglas company followed up their great success with this design by producing another low wing twin-engined air liner, this time designed particularly for night flying. The Douglas DC-3 "Sleeper Transport," or "Sky Sleeper" as it was better known, was luxuriously furnished to provide sleeping accommodation for 14 passengers and daytime seating for twice that number. It had a top speed of 212 m.p.h. Next the much bigger Douglas DC-4 liner was produced, to the joint order of the five largest air transport firms in the United States. This machine had a wing span of 138 ft. 3 in. and was designed to carry 42 passengers by day and 30 by night, and a crew of five. It was described in the "*M.M.*" of January 1939.

The development of these commercial machines did not prevent the company from designing and producing many new types of military aircraft, and some of these have been outstanding successes. For instance, the Douglas B-18 twin-engined bomber, an adaptation of the DC-3 "Sleeper Transport," won the United States Army Air Corps Bomber Competition in 1936, and 133 machines of this type were ordered for the Corps. It is a middle wing monoplane with two Wright "Cyclone" engines that give it a top speed of about 225 m.p.h. The bomb load is stowed inside the fuselage, and there are gun positions in the nose and in the top and bottom of the fuselage, behind the wings. Later the company received an order for 255 B-18As, a development of the original bomber.

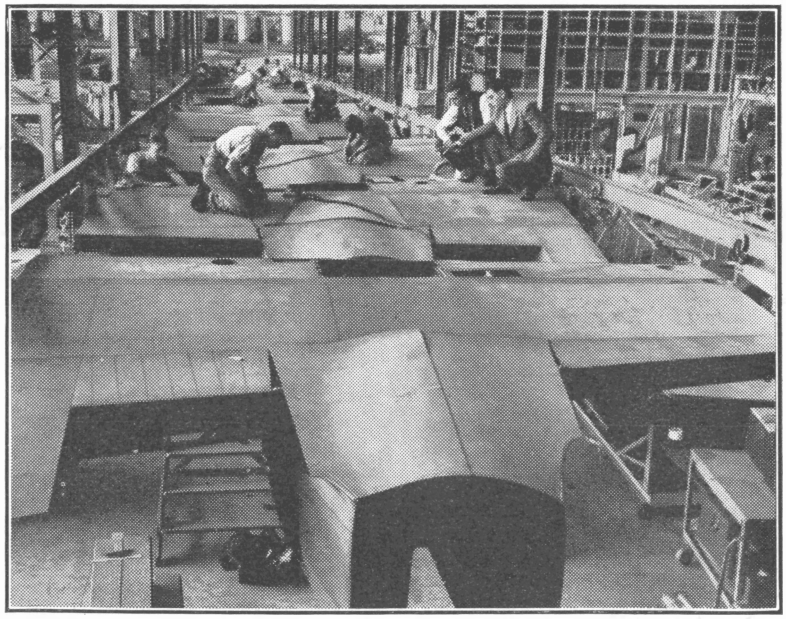
Another interesting Douglas military aeroplane produced about this time was the TBD-1 dual-purpose torpedo-bomber monoplane for the United States Navy. This the company claimed to be the first monoplane chosen for operating from an aircraft carrier; it was a single-engined low wing machine and carried a crew of three.

By 1938 the Douglas factory at Clover Field had grown to 20 times its original size, and the number of employees had increased from 350 to 8,698. In that year the company absorbed the Northrop Corporation, a subsidiary firm with a factory at El Segundo, 35,000 sq. ft. in extent. This firm had specialised in single-engined all-metal aircraft, and some of their outstanding military types had been supplied in quantity to the United States Army Air Corps and Navy.

The year 1939 was notable to the Douglas Company for the granting of the official air-worthiness certificate for the big DC-4 air liner already mentioned, and for the completion of the 350th. DC-3 "Sleeper Transport" and the 200th. DC-3 "Commercial Transport," a day version of the D.S.T. On the military side the company were busy producing single and twin-engined military types for the United States Army Air Corps and for several foreign governments.

The substantial orders for American military aircraft placed during 1940 by the British Purchasing Commission caused the leading American aircraft producers to greatly extend their factories. More recently the passing of the Lease and Lend Act for increased aid to Britain, and the introduction of a formidable United States defence programme, have stimulated further unprecedented expansion of those factories. It was quickly realised, however, that mere extension of equipment was not sufficient to enable the industry to cope with the great demands now being made upon it, and that drastic reorganisation of factory layout and of production technique also were necessary.

The Douglas Aircraft Company have tackled their part in this big problem with characteristic promptness and energy. It was decided to adopt a streamlined assembly method on the lines of those used in the American motor car industry, but adapted to the special requirements of a bomber producer. The company began by forming a new plant layout department to draw up plans for reorganising the factory departments and assembly lines on a "progressive" basis, so that instead of each department being a separate "job shop," aeroplane parts could be sent through in continuous flow to the final assembly and completion of the aircraft.



The overhead rails carrying the bomber wings are typical of the jig track system designed to speed production under the new plant setup.

Aircraft parts made up in the fabricating departments now flow into the major departments, (Continued on page 234)

British Railways in Wartime

"M.M." readers will have become familiar with the annual publication *"Facts About British Railways"* issued during the past few years by the British Railways Press Office. This year in view of the special part played by our railways in the national effort, and the inclusion of facts and figures relating to this, the title of the booklet has been expanded as shown by the heading to this article. Some of the more interesting details are mentioned briefly below.

It is pointed out in a foreword written by Lt.-Col. J. T. C. Brabazon-Moore, until recently Minister of Transport, that our transport system was not planned and built for war. The necessity for adapting this peace-time system to the needs of war which has been going on ever since September 1939 makes the achievement of our railways, the biggest part of the transport machine, all the more remarkable. Although a private undertaking, Britain's largest in fact, with a capital of £1,099,576,000, the railways under Government control since the war have been managed by the Railway Executive Committee appointed by the Minister of Transport. Under their direction 555,337 railwaymen over 20,000 miles of railway have not only obeyed the injunction *"Go to it,"* but by their persistent endeavour, cool courage in the face of hostile air attack, and in spite of the severity of last winter and the difficulties of wartime conditions generally, have managed also to *"Keep at it."*

An L.M.S. "Fitted" freight train hauled by a standard 2-6-0 mixed traffic locomotive. Photograph by courtesy of L.M.S.

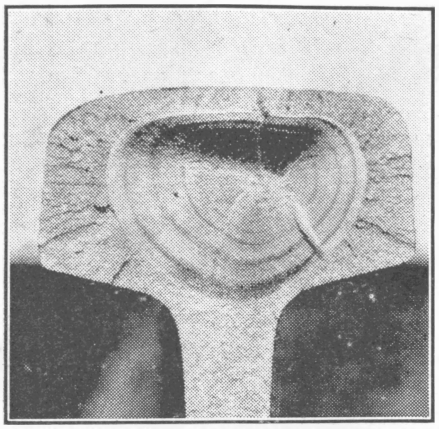
The needs of an ever-expanding war effort at home, in addition to the necessities of domestic transport, have caused the railways to operate at high pressure. Then there have been trains required for troop movements on a large scale; to give a single instance, on a single day 73 trains for troops were run by one railway alone. Trains for the evacuation of children, for the transport of refugees from invaded countries, for the conveyance of aliens to concentration camps, of prisoners of war, materials for munitions factories and of livestock from certain vulnerable areas all added to the demands on the railways. To show how flexible is the service, special movements in connection with the Dunkirk evacuation required 620 trains for 300,000 men to be run within eight days without any prior knowledge of their arrival at seven ports in the South East of England. To effect this 2,000 coaches were formed into a rolling stock "pool," and the whole of the movements were directed almost entirely by telephone. During the peak period 100 of these trains were run in 24 hours; and at the same time as the whole of this evacuation traffic was going on 20,000,000 passengers and 6,000,000 tons of freight were carried by normal services throughout the country!

On the traffic side again ambulance trains for home service have been fitted up in the railway shops from standard passenger vehicles. Each has accommodation for the medical personnel, ward cars for different types of cases and a kitchen car and provision for stores. Then there are also casualty evacuation trains primarily intended for the conveyance of civilian casualties.

Operations on such a vast scale as indicated by the foregoing have been carried out in spite of the difficulties peculiar to wartime working. One of the biggest problems has been the necessity for complete black-out during the hours of darkness. Much experimental work prior to the war was undertaken to determine the best possible lighting conditions at stations, in yards and in trains; and to deal with electric signal lights, fogmen's fires and the glare from locomotive fire-boxes. As a result of the re-arrangement of electrical circuits and the use of much new wiring reduced lighting under the control of master switches allows work to be carried on at certain selected centres. There lights are extinguished as soon as there is a preliminary warning of an "alert." Special measures to permit emergency wartime lighting inside railway carriages have involved attention to half a million lamps and shades and the re-equipment of 46,000 vehicles. Signal lights of all descriptions, so necessary for the continuance of railway operations, have been approved by the Government; signal light beams are highly directional and, while bright in the immediate path of the beam, lose brilliance rapidly when viewed from an angle.

During air raids all branches of the railway services operate as nearly as possible normally. Railwaymen continue at work during "alerts;" passenger and goods trains continue to run. Work is carried on generally until danger is imminent, and is resumed again as soon as the immediate danger is past. Special responsibility attaches to the engineering staffs who tackle the job of making repairs. Even when raids are in progress reports of damage to every detail of the companies' properties are followed up. As a general rule the most extensive damage to permanent way has been repaired within 12 hours of its having taken place.

These details and many others of equal interest are given in *"Facts About British Railways in Wartime,"* issued free by the British Railways Press Office, 2, Caxton Street, Westminster, London S.W.1.



Rail cut to show a transverse fissure discovered by the Sperry detector car.

The Sperry Detector Car

How Invisible Rail Defects are Found

WHEN we read of high speeds and record performances on our railways we usually have in mind the wonderful locomotives, many of them streamlined, that have been designed to give these magnificent results. The share of the track in these achievements should not be overlooked, however. Unless this is sound and well laid the vast energy of the giants of the steel highway would be largely wasted.

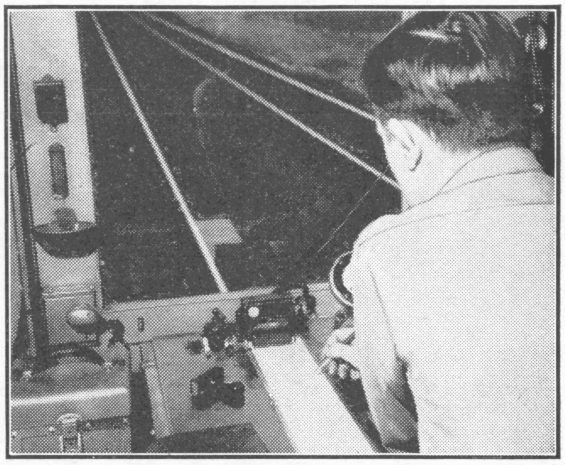
A broken rail is easily seen and can be replaced, but in service rails may develop hidden defects of various kinds that in time may lead to fracture, and may be the cause of derailments. One of these defects has been described as a rail "cancer," because it begins as a minute crack or opening within the rail itself, and "grows" or spreads steadily until the rail breaks under its load. Another trouble to which rails may be subject is "split head." This is said to be a common defect, especially the form in which the split is horizontal, while a vertical split may extend until it is several feet long.

Wherever these defects are present they are made more and more extensive, and consequently more dangerous, by the loads imposed on the rails as our modern heavy trains pass over them. This is not the only way in which train operations affect the rails, however. The driving wheels of engines may slip on starting, rotating rapidly over narrow sections of the rails and heating them intensely. Rail burning of this kind also occurs when the brakes are applied, for then locked wheels slide over the rails, and the friction is considerable. Wheel burns are dangerous because cracks and fissures seem to develop underneath them.

Fissures and rail breaks became very disturbing to railway officials in the United States about 20 years ago, and in 1923 the attention of Dr. E. A. Sperry, the famous American scientist and inventor, was directed to the problem of finding defects before they became really dangerous. Dr. Sperry had already distinguished himself by the invention of the gyroscopic compass, and of giant lights for illuminating airfields at night, and after five year's work he solved this new problem. His first detector car, which searched out cracks and holes in the rails when it was run slowly over them, was a very crude affair, which has been compared to a soapbox on wheels. It did find the fissures, however, and it was the forerunner of a fleet of detector cars that are now in constant use. Dr. Sperry did not live to see this fleet in action, for he died in 1930, but he knew that the problem of detecting rail defects was mastered. Step by step the methods that he introduced have been made more searching and delicate, until to-day the tiniest cracks and defects of all kinds can be discovered in their earliest stages and the diseased rails can be removed.

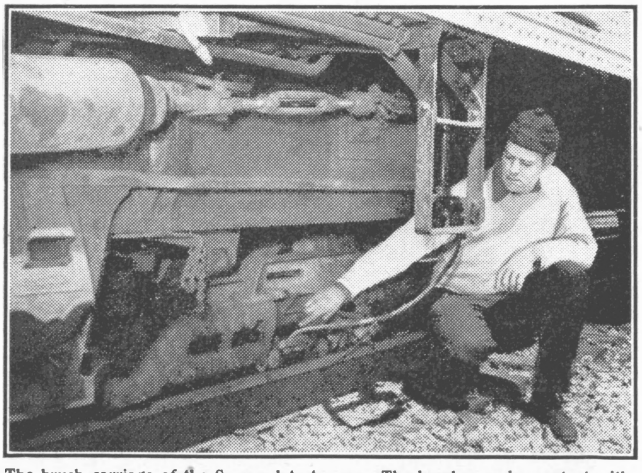
The plan that Sperry worked out was a simple one. The idea was to pass a direct electric current through a section of rail. This would have to deviate through the metal round any crack or fissure in the head of the rail instead of flowing through evenly, and so would be concentrated to give a distortion in the magnetic field created by the current. This distortion was to be detected by coils passed over the rail, as the current induced in the moving coils would vary with changes in the field. The scheme was perfectly successful. To begin with Sperry used two detecting coils, each covering practically the entire width of the rail and one placed ahead of the other. These were a little uncertain in regard to fissures on one side of the centre, so pairs of coils, each covering half the width of a rail, were introduced, and two pairs placed in staggered formation are now employed in order to reveal cracks or fissures in all possible positions.

The Sperry detector car carrying this equipment is provided with berths and other accommodation for the men who carry out the tests. This provision is necessary, for often the car is at work in districts that are only thinly inhabited. An internal combustion engine drives the vehicle, and a petrol engine in a special compartment drives the generator that supplies current. The car moves at a speed of 5 to 8 m.p.h. along the track to be tested. On each side are sets of metal brushes in contact with the rails, and through these a heavy continuous electric current of low voltage is passed in order to set up the magnetic field. The coils are placed between the brushes and are mounted just above the rails and clear of them. The varying currents induced in them are amplified by equipment inside the car, and then used to guide the recording pen, which marks a track on a moving tape. The increase in current that reveals a defect by swinging the pen sideways across the recording tape is ingeniously made to mark it at the same time by operating a paint gun under the car that leaves a dab of white paint on the rail. That the white spot marks a defect has been shown time and again by cutting rails suspected after a test of being defective, when cracks and cavities of some kind have always been revealed.



Watching the tape in the recording compartment. We are indebted to Sperry Products Inc., Chicago, for our illustrations.

Many improvements have been made since the Sperry rail defect detecting car was introduced. One of these was devised when it was discovered that each face of a transverse fissure itself became a magnetic pole, and this upset the magnetic properties of the rail. It is important that no such disturbing effect should be present, and with this in mind additional brushes were placed ahead of those supplying the detecting current circuit. These were used to allow a heavy direct current to be applied to the rail, the effect of this electrical jolt being to line up the tiny particles of metal so that there is no magnetic distortion. Yet another improvement is the introduction of a second pen, driven by an independent detector system. This is so designed that it does not respond to surface defects, such as burns, but only to the presence of internal fissures and of fractures that are steadily but surely growing larger. During 1939 nearly 48,000 defective rails were discovered by the detector cars of the Sperry fleet.



The brush carriage of the Sperry detector car. The brushes make contact with the rails and the heavy testing current is passed through them.

RAILWAY NEWS

More "J39" Class L.N.E.R. Engines

Further new 0–6–0 standard goods and mixed traffic engines of L.N.E.R. class "J39" have recently been noted at work in the North Eastern area, where they were built. Those so far seen are numbered 3081-7. They are provided with tenders off former N.E.R. 4–4–0 locomotives that have been withdrawn.

By Steam to Brighton

Although the S.R. main line between London and Brighton was electrified in 1933 as part of the conversion of all the principal Central Section routes, it is still possible to travel between London and Brighton by steam train via either Uckfield or East Grinstead. In each case the main tracks are left at South Croydon and the North Downs line is traversed to Oxted. On this, as well as beyond, there are long, steep gradients with much curvature, and the fine scenery passed through is perhaps adequate compensation for the additional time occupied. The quickest steam service over this hard road, which is 13 miles longer than the direct route, takes about double the time occupied by the fastest electric non-stop trains, and 11 stops are made on the way.

"Atlantic" engines, described in the April 1941 *"M.M.,"* have been frequently employed during recent years over the principal secondary route, through Uckfield. "H2" class No. 2424 *"Beachy Head,"* by then probably carrying the higher boiler pressure of 200 lb. per sq. in., with a heavier load than usual, of 240 tons full, made an excellent non-stop run between Oxted, Surrey, and Eridge, Sussex. A rapid start along three miles mostly downhill at 1 in 103-32 enabled the first 5¼ miles to Edenbridge, Kent, to be covered in 6 min. 52 sec., the maximum attained being 68 m.p.h. A minimum of 52 m.p.h. was capital work up the ensuing two miles at 1 in 100-20, but the train was now well before time and the engine was decidedly eased, so that no higher speed than 66 m.p.h. was noted on the gentler Ashurst descent. Still Eridge was reached in 18½ min. for 15½ miles compared with the 21 min. allowed, and thus a late start of 2 min. had been more than recovered.

The best of a number of 4–4–0 runs with the same train on this stretch was made by "B4x" rebuild No. 2067, which with 220 tons took only 7 sec. longer start to stop, though her average up the Hever bank was 6 m.p.h. slower than the bigger 4–4–2's achievement. After Eridge a 1 in 80 climb ensues for 2½ miles, but reduced load and more frequent stops lessened the interest in the running

In the opposite direction "H2 Atlantic" 2425 *"Trevose Head"* had a really stiff task with a corridor train weighing 255-260 tons full. Yet on balance she had several minutes in hand notwithstanding the fact that stops were made at all stations on the severest sections. For instance, a gain of half a minute was made between Buxted and Crowborough, where the curved 1 in 80 climb of 2 miles up to Ashdown Forest was surmounted at a minimum of 30 m.p.h., following the attainment of 40 m.p.h. on the easier 1¼ miles immediately after Buxted start.

New South Wales Government Railways 4-6-0 locomotive No. 3658 at the head of a Wagga Wagga passenger train, leaving Moss Vale. Prize-winning photograph by R. B. McMillan, Victoria, Australia.

Enormous Traffic Achievements

An idea of the huge magnitude of the special passenger traffic which British railways have been called upon to handle on Government account during the first eighteen months of war is provided by figures given in official announcements. On the L.M.S. 10,512 special trains were run, conveying 86,308 officers and 2,960,142 other ranks of the Fighting Forces. The S.R. ran 1,000 special trains for evacuees in 1939 and 300 more in 1940. In 1940 there were 2,000 S.R. specials for the B.E.F. alone, apart from the hundreds of extra trains required in connection with the evacuation from Dunkirk.

* * * *

The number of railway employees in the United States during 1940 averaged 1,026,000.

A "Tube" Train Visits the Seaside

In trial trips before going into service underground one of the new set trains for the Waterloo and City Railway in London, which is owned by the S.R., was run over the electrified main line to Brighton and back, a distance of 102 miles. The train presented an unusual spectacle en route. Shorter experimental runs also were made in the suburban area of the Western section.

This new rolling stock was illustrated and the modernisation of London's shortest "tube" described in the *"M.M."* for January last.

A Locomotive Class Becomes Extinct

L.N.E.R. class "G9" became extinct at the end of last year when No. 9475 was withdrawn. It consisted of 12 0–4–4 tank engines of comparatively modern design built for the former North British Railway in 1909. The driving wheels were 5 ft. 9 in. in diameter, and the inside cylinders were of 18 in. diameter and 26 in. stroke. The combined heating surface was 1,309 sq. ft., the boiler pressure 175 lb. per sq. in. and the grate area 16¾ sq. ft. They were neat little engines with the same boiler as many of the N.B.R. 4–4–2 and 0–6–2 tanks of Classes "C15" and "N14-15," and they were chiefly employed in local and shunting work in the regions of Edinburgh, Dundee, Dunfermline, etc.

It will be remembered that the ex-Great Eastern 0–4–4T "G4" class became extinct a year or two ago, and the only important engines remaining with this wheel arrangement are those of the numerous Class "G5" of the former North Eastern Railway. This consists of over 100 engines, which have worked local passenger services in the busy North Yorkshire, Durham and Northumberland districts for many years. One of these stout little locomotives, No. 1837, once ran the *"Coronation"* streamlined express in an emergency from Durham to Newcastle, a distance of 14 miles, in 22 min.

Londonderry and Lough Swilly Line

In the paragraph regarding this northern Ireland narrow gauge light railway that appeared in *"Railway News"* in our April issue, the 4–6–0, 4–6–2 and 4–8–4 tank classes were referred to as having been built between 1899 and 1904; the latter date should have been 1912. Locomotives 5 and 6, 4–8–4T, were built in 1912; 13 and 14 in 1909; 11 and 12, the only tender locomotives on the line, in 1905. No. 11 is now scrapped; the other locomotives, except the one 0–6–0T, were all from 1899 to 1903. The 0–6–0T *"Inishowen,"* the only named locomotive and the heaviest per axle on the line, has now been scrapped.

A Light Railway with Elephant Power

The Indian Government have approved the construction of a light railway in one of the Andaman Islands, situated in the Bay of Bengal, for the purpose of transport through dense forests of timber and other products to Port Blair for shipment. The motive power will be provided by elephants!

Somerset and Dorset 2-8-0 Engines

Readers may have been interested in the large 2–8–0 mineral locomotives, which for over 20 years have operated freight traffic on the steeply graded Somerset and Dorset Joint line between Bath and Bournemouth, because until the recent advent of the Stanier 4–6–0 passenger engines, they were so much bigger than anything else seen in the area. Indeed when the first six were constructed at Derby in 1914 they were of quite outstanding size for the former Midland Railway, which supplied the engine power on the S.D.J.R. and built no such large type for its own main system. The boiler was almost the same as then fitted on the well-known Deeley 4–4–0 compounds of the "1000" class, which were described and illustrated in the March *"M.M."*, having a total evaporative heating surface of 1,321 sq. ft. with superheater area of 360 sq. ft. The two outside cylinders are 21 in. in diameter, with a 28 in. stroke, the coupled wheels have a diameter of 4 ft. 7½ in. and leading wheels 3 ft. 3½ in. The grate area of the Belpaire firebox is 28.4 sq. ft., and the boiler pressure 190 lb. per sq. in.

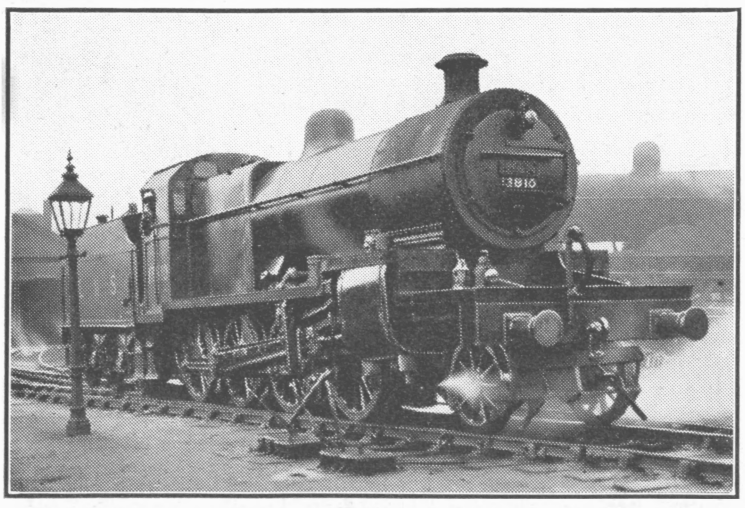
Five more of these engines were built by Robt. Stephenson and Co. Ltd., in 1925, with a larger boiler providing 150 sq. ft. more evaporative heating surface, slightly more superheat and an increased adhesion weight. Left-hand drive was substituted for right-hand, and Ross "pop" safety valves of modern type replaced those of the Ramsbottom style. When going through shops, however, two of these later engines had spare boilers of the original size recently fitted.

In the L.M.S. stock the S.D.J.R. 2–8–0s are classed "7F" and their present numbers are 13800-10. No. 13810, the last of the second batch, is illustrated on this page. When the photograph was taken the engine was also carrying her previous L.M.S. number 9680 on the front of the smokebox, but this cannot be distinguished.

New Pacifics for Indian Railway

In accordance with the recent decision of the Indian Railway Board to standardise locomotive types that have proved satisfactory, four more express passenger engines have recently been completed in the British Vulcan Foundry works. These are of an intermediate class "WL" in 4–6–2 series "W." They are for the 5 ft. 6 in. gauge of the North-Western Railway.

The engines have two outside cylinders with a diameter of 18½ in. and a stroke of 28 in., and coupled wheels 5 ft. 7 in. in diameter. The working pressure is 210 lb. per sq. in. Bogie tenders are attached with a capacity of 4,000 galls. for water and 10 tons for coal. The firebox is of the wide Belpaire type. Steam distribution is effected by long-travel 10 in. piston valves actuated by Walschaerts gear on familiar British lines. Roller bearings are provided in motion parts and axle boxes. Two of the locomotives have A.C.F.I. feed-water heating apparatus, these being 1 ton heavier at 84 tons, without tender, than the two without that equipment, which is always rather unsightly. Welding has been employed extensively throughout in the construction of the engines.



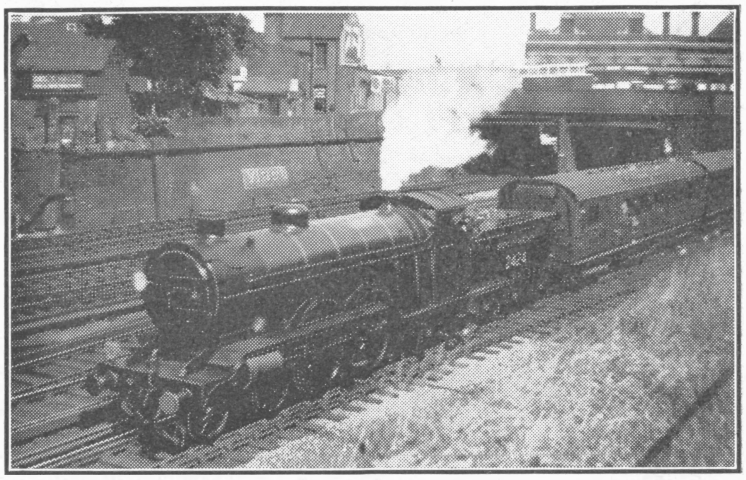
L.M.S. 2-8-0 locomotive No. 13810 on the Somerset and Dorset Joint line at Bath. The engine was formerly No. 9680, and originally was S.D.J.R. No. 90. Photograph by H. C. Casserley.

Travelling Post Offices Withdrawn

Although some of the famous postal trains still run, between London and Aberdeen, London and Penzance, Bristol and Newcastle and so on, they consist during the present emergency of stowage vans for mails and parcels, and many such vehicles also being run on ordinary trains. It has been officially announced that T.P.Os. in which sorting is done and from which bags are dropped or picked up while the train is in motion, are dependent for satisfactory working upon an elaborate and closely-linked network of cross country services which must be punctually operated. In present conditions it is impossible to maintain such regularity throughout long journeys, and it has been found better to carry out sorting and packing for the most part in the town offices, the necessary transfers of bags being made at suitable junctions and principal points at which trains stop. Post Office representatives still travel by the more important of these mail trains.

NEW AMERICAN LOCOMOTIVE GIANT

An enormous streamlined express locomotive has recently been placed in service on the Pennsylvania Railroad, in the United States after exhibition at the New York World Fair. It has the 6–4–4–6 wheel arrangement. Six-wheeled bogie and trailing trucks help to carry the weight of the huge boiler, and between them are two independent sets of 7 ft. driving wheels, each driven by a pair of outside 22 in. cylinders, having a stroke of 26 in. For the steam distribution 12 in. diameter piston valves are actuated by a light form of Walschaerts valve gear. All four sets of valve motion are controlled by one power reversing unit in the cab.



The peace-time Newhaven Boat Express of the S.R. at Croydon. The engine is No. 2424, an "Atlantic" of the former L.B.S.C.R. Prize-winning photograph by J. F. Taylor, Beckenham.

The boiler is 21 ft. 11 in. long between tube-plates, having an outside diameter varying from 7 ft. 9 in. to 8 ft. 4 in. It carries a working pressure of 300 lb. per sq. in. The combined heating surface is 7,746 sq. ft. and the grate area is 132 sq. ft., totals that are respectively about 2½ and 3½ times the corresponding figures for the L.N.E.R. streamlined "Pacifics"! The average adhesion weight on the four driving axles is 31½ tons each, or about 9 tons more than the highest usually allowable in this country.

The 16-wheeled tender weighs 202 tons in working order, and itself is a good deal heavier than the largest ordinary British engine and tender complete. It can accommodate 23 tons of coal and 20,200 gall. of water. The combined weight of engine and tender is 473 tons, the overall length being 140 ft. The object of the designers was to secure an indicated horse power of 6,500 with a locomotive capable of attaining 100 m.p.h. on the level when hauling a heavy train weighing 1,000 to 1,100 tons, but no details are yet available as to actual performance.

THE TEXAS ZEPHYR

There are now seven "*Texas Zephyr*" 2,000 h.p. 12-wheeled locomotives, or rather "steel power stations on wheels" at work on the Chicago, Burlington and Quincy Railroad in the United States. Four are of the "A" type, which can operate singly if no more than 2,000 h.p. is required, while three are of the "B" type used for double-heading heavy trains.

The bogies run on 3 ft. diameter wheels and all axles are fitted with roller bearings. The motors are geared direct to the axles and are supplied with current by a 600 v. main generator. A Clarkson type boiler supplies steam for heating.

"ONE OF OUR LESS CIVILISED TRAINS"

The following amusing story is quoted by "*The Railway Gazette*" from "*The Irish Times*."

"The other day I was travelling to Athboy on one of our less civilised trains. Just about a mile outside the station the train came to an abrupt halt. I looked out of the window and saw a cow and her calf sauntering across the line. In spite of the loud and vulgar noises emitted by the engine, the cow and her offspring refused to hurry, and it was only after a delay of some minutes that the train was able to proceed on its way.

"Returning from Athboy on the same train the following day, I was again surprised to see that the train had stopped scarcely a hundred yards out of the station. Again I looked out of the window, and this time I saw that a prospective passenger had been sighted in the distance and the train had been halted to allow him to catch it. He arrived, and the train started. It had hardly got properly under way before there was another prolonged halt. Sticking my head out of the window once more, I saw the same cow and calf on the line again, only this time apparently they had no idea of allowing the train to proceed, for they were walking away from it in between the tracks. It was not until the driver of the train and the fireman actually threatened the animals with pokers and other fire implements that they moved off. Thank Heaven we still have Irish railways worthy of the name."

New Meccano Models

A Dumper Car and Cargo Boat

WHEN stone, gravel and similar materials have to be transported over short distances, as on construction sites, a dumper is sometimes used for the work. The advantages of such a vehicle over a lorry are that it is able to travel rapidly over rough ground and is more easily manœuvred. A miniature dumper that can be built from parts in Outfit No. 3 is shown in Fig. 1 on this page. This is a splendid working model to build, and it is designed so that it may be used in conjunction with a Meccano model crane or a conveyor to provide real fun.

The chassis is the first part of the model to build. The longer flanges of a 5½″×2½″ Flanged Plate 1 are extended 1″ by two 2½″ Strips and two 2½″ Cranked Curved Strips. The free ends of these Strips are joined to a 2½″×½″ Double Angle Strip at the rear end of the model. A seat for the driver is formed from a 5½″×1½″ Flexible Plate 2, to which a similar Plate 3 is attached by a ½″×½″ Angle Bracket.

A *Magic* Motor 4 is attached to the Plate 1 and also to the left-hand 2½″ Strips by a ½″×½″ Angle Bracket.

A lever 5 for starting and stopping the Motor is constructed by fixing a ½″ Reversed Angle Bracket to the control lever of the Motor. A 2½″ Strip is lock-nutted in the elongated hole of this Reversed Angle Bracket and it is pivoted by its centre hole on a bolt fixed in the Motor sideplates.

The steering column is journalled in the chassis and in a ½″ Reversed Angle Bracket. It carries a Spring Clip, which prevents the rear wheels from swivelling when there is no control on the steering wheel, and on its lower end it has a Cord Anchoring Spring. Cord is fastened at its centre to the Cord Anchoring Spring, and one half of it is wrapped several turns in a clockwise direction around the Spring, while the other half is wrapped in an anti-clockwise direction, the ends of the Cord being tied to the rear castor.

The front axle carries two 1″ Pulleys, one of which is connected by a belt of Cord to the pulley on the *Magic* Motor, the other forming a drum for an external contracting band brake. A length of Cord is passed around the Pulley and one of its ends is tied to the chassis, while the other is tied to a 2½″ Cranked Curved Strip 6 lock-nutted to one arm of a Double Bracket bolted to the Plate 1. A Rod and Strip Connector is pivoted to the other arm of the Double Bracket, and a 1½″ Rod held in it forms a lever 7 for tipping the container.

The container is pivoted on a 4″ compound rod passed through two Flat Brackets bolted to its base and two Flat Trunnions bolted to the chassis. A length of Cord is fastened to the forward end of the container and is passed around a ½″ loose Pulley lock-nutted to one arm of a Cranked Bent Strip bolted to the chassis, its other end being secured to the tipping lever 7 by a Spring Clip. After tipping, the container is pulled back to its original position by a 2½″ Driving Band tied to its rear end and to a Double Bracket bolted to the chassis.

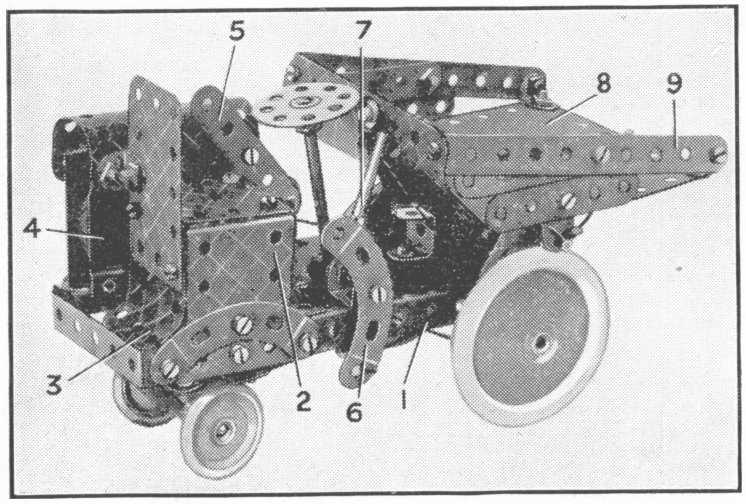


Fig. 1. A dumper car designed for construction from Outfit No. 3.

Parts required to build model dumper: 2 of No. 2; 9 of No. 5; 5 of No. 10; 2 of No. 11; 8 of No. 12; 2 of No. 16; 2 of No. 17; 1 of No. 18a; 4 of No. 22; 1 of No. 23; 1 of No. 24; 6 of No. 35; 56 of No. 37a; 48 of No. 37b; 6 of No. 38; 1 of No. 44; 1 of No. 48a; 1 of No. 52; 3 of No. 90a; 4 of No. 111c; 2 of No. 125; 2 of No. 126; 2 of No. 126a; 2 of No. 155a; 1 of No. 176; 1 of No. 186; 2 of No. 187; 1 of No. 188; 2 of No. 189; 2 of No. 192; 1 of No. 199; 1 of No. 212; 1 of No. 213; 1 *Magic* Motor.

The model shown in Fig. 2 is a reproduction of a small tramp steamer of the type used in coastal trade. Its construction is commenced by building the hull, details of which are clear from the illustration.

The forward hold is covered by two 2½″ Flat Girders 1 hinged to 3″ Strips edging the opening in the deck. The rear ends of

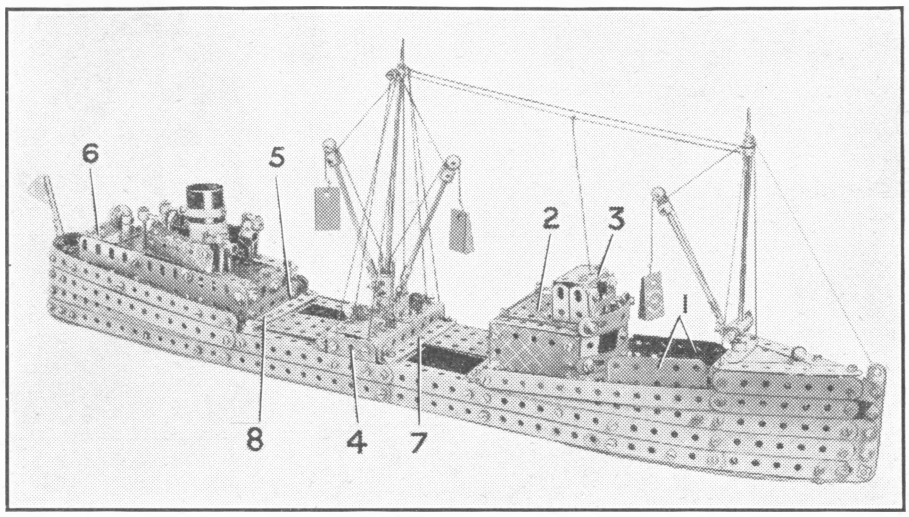


Fig. 2. A sturdy and realistic model cargo boat. It has three holds, each fitted with a removable hatch.

the Strips are bolted to a 3½″ Strip to which two 2½″ Curved Strips are attached. The inner edges of the Curved Strips lie against the curved front of the bridge, which is built as follows. A 2½″×2½″ Flat Plate 2 is edged on three sides with a 5½″×1½″ and a 2½″×1½″ Flexible Plate. The ends of these are bridged by two 3″ Formed Slotted Strips forming the front.

The wheelhouse 3 and the complete bridge structure are fixed by ½″×½″ Angle Brackets to a 3½″×2½″ Flanged Plate bolted between the sides of the ship.

The after-deck consists of two 5½″ Strips bolted at their forward ends to a 3½″×1½″ compound flexible plate secured in position by a 3½″ Angle Girder and Angle Brackets. The rear ends of the 5½″ Strips are bolted to a 1½″ Corner Bracket that carries two Flat Brackets. A 2½″ Flat Girder 5 is secured to Angle Brackets bolted to the after-deck, and a 6½″ compound flat girder consisting of a 4½″ and a 2½″ Flat Girder overlapped, are attached to each side of it. The rear ends of the compound flat girders are joined to a 1½″ Flat Girder. Each lug of a Raked Ships' Funnel is bent at a right-angle and then bolted by a ⅜″ Bolt to the compound flat girders. A Threaded Boss is secured to the Flat Girder 5.

The boat deck is a 6½″×1½″ compound flexible plate 6 consisting of a 5½″×1½″ and a 2½″×1½″ Flexible Plate joined together by two Threaded Pins. This is bolted at the after end to a 1½″ Angle Girder attached to the 1½″ Flat Girder.

Parts required to build model cargo boat: 8 of No. 1; 2 of No. 1a; 6 of No. 1b; 4 of No. 2; 2 of No. 2a; 15 of No. 3; 7 of No. 4; 5 of No. 5; 5 of No. 6; 11 of No. 6a; 2 of No. 8; 7 of No. 9b; 1 of No. 9f; 10 of No. 10; 2 of No. 11; 70 of No. 12; 2 of No. 12a; 4 of No. 12b; 12 of No. 12c; 3 of No. 16; 1 of No. 16b; 1 of No. 17; 1 of No. 18b; 302 of No. 37a; 260 of No. 37b; 61 of No. 38; 1 of No. 40; 1 of No. 53; 8 of No. 59; 3 of No. 62b; 1 of No. 63; 1 of No. 64; 2 of No. 69; 1 of No. 72; 1 of No. 73; 2 of No. 77; 4 of No. 81; 2 of No. 89; 2 of No. 90; 1 of No. 90a; 2 of No. 103c; 5 of No. 103f; 3 of No. 103h; 7 of No. 111a; 14 of No. 111c; 7 of No. 114; 2 of No. 115; 1 of No. 116a; 2 of No. 120a; 1 of No. 133; 1 of No. 133a; 1 of No. 136; 3 of No. 136a; 1 of No. 138; 2 of No. 176; 10 of No. 188; 2 of No. 189; 1 of No. 190a; 1 of No. 192; 2 of No. 197; 6 of No. 212; 3 of No. 213; 2 of No. 214; 7 of No. 215; 3 of No. 217b; 2 of No. A1083; 1 short length of thin wire.

Suggestions Section

By "Spanner"

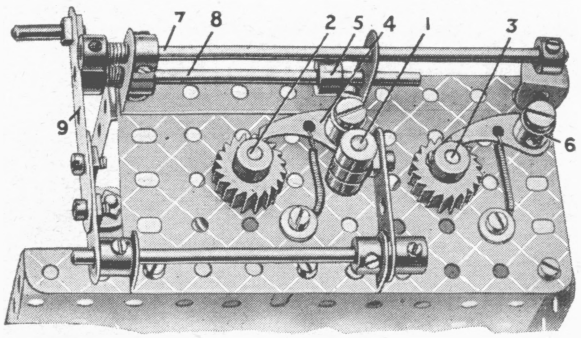


Fig. 513

(512) A Simple Three-Point Switch

The switch shown in Fig. 512 is designed for use in connection with an electric train layout in which the track is wired up in sections. By means of this switch any one of three different sections can be made "alive" or "dead" as required, and any combination of two or three sections also can be controlled.

The switch contacts are mounted on a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate, in one end of which are fixed three Terminals, insulated from it by means of Insulating Bushes and Washers. A 1" Screwed Rod is fixed in a Handrail Coupling 1, and a 1" Corner Bracket 2 is then clamped on the Rod against the Coupling by means of a Nut. The Screwed Rod is passed through a hole in the Flanged Plate as shown and held firmly in position by a Nut and a Compression Spring.

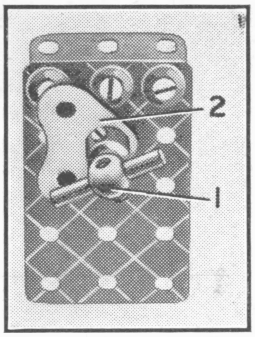


Fig. 512

(513) Self-Acting Brake for Model Cranes ("Spanner")

The shaft 1, Fig. 513, is slideable in its bearings, and carries a $\frac{1}{2}''$ Pinion that can be brought into mesh with a 57-teeth Gear on the Rod 2 or with a similar Gear on the Rod 3. The Rod 1 bears two fixed Collars, between which a third Collar is free to rotate on the Rod. A Bolt is inserted through the elongated hole of a Crank, and is fitted with a nut before being screwed into the tapped bore of the centre Collar.

The Crank is fixed on a $3\frac{1}{2}''$ Axle Rod journalled in a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip, and a second Crank is fixed on the other end of the Rod. To this is bolted a $2\frac{1}{2}''$ Strip 9 bearing a Threaded Pin and serving as the gear change lever. By moving the lever to the left the Pinion on the Rod 1 is brought into engagement with the 57-teeth Gear on the Rod 2, and with the lever 9 in its opposite position the Pinion is thrown out of gear and engaged with the Gear Wheel on the Rod 3.

Both driven Rods carry Ratchet Wheels fitted with Pawls 4 and 6. The Pawls are held in engagement by short lengths of Spring Cord, and the Pawl 4 has a Bolt in its centre hole. The Collar 5, mounted on a sliding $3\frac{1}{2}''$ Rod 8, bears against the head of the Bolt, and raises the Pawl 4 from its Ratchet Wheel. Movement of the lever 9 to the right releases the Pawl 4 and raises the Pawl 6 as shown.

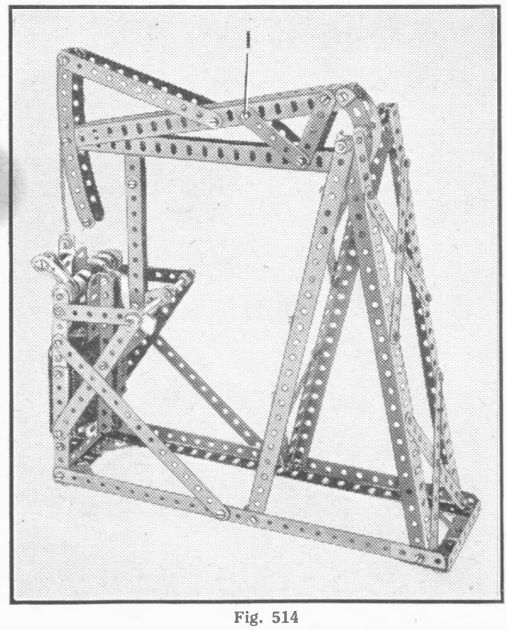


Fig. 514

(514) Drive Converter for Model Beam Engines ("Spanner")

Figs. 514 and 514a show a model of a novel mechanism that was introduced as a substitute for the crank for use in beam engines. With the aid of this mechanism the reciprocating motion of the beam is converted into rotary motion.

The end of the beam 1 remote from the cylinder is moulded to a curved form by two $5\frac{1}{2}''$ Curved Strips, which are bolted to it. A length of Sprocket Chain is attached to the upper ends of these Strips and its other end is secured to a $6\frac{1}{2}''$ Rack Strip 2 that is bolted to two $5\frac{1}{2}''$ Angle Girders, but is spaced from them by three Washers. The Angle Girders slide up and down between two $3'' \times 1\frac{1}{2}''$ Flat Plates 3, and two $3\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips secured to similar Double Angle Strips 5 attached to the Girders 4.

The Rack Strip 2 meshes with a $\frac{3}{4}''$ Pinion 7 held in one end of a Socket Coupling on a Rod 6. A Crank is held in the other end of the Socket Coupling and has a Pivot Bolt and a Flat Bracket bolted in the end hole of its arm. A Pawl is mounted pivotally on the Pivot Bolt and is held in engagement with a Ratchet Wheel fixed on the Rod 6 by a short length of Spring Cord attached to it and the Flat Bracket. The Pawl must be so placed that it drives the Rod 6 when the Rack Strip 2 is drawn upwards, but does not rotate it when the Rack Strip 2 is lowered.

A second similar unit is also placed on the Rod 6, and in this case the $\frac{3}{4}''$ Pinion meshes with a $3\frac{1}{2}''$ Rack Strip 8 that is bolted back to back with a similar Rack Strip fixed to two $5\frac{1}{2}''$ Angle Girders. The Angle Girders slide between two $3\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips secured to the Double Angle Strips 5, and two $3'' \times 1\frac{1}{2}''$ Flat Plates attached to $2\frac{1}{2}''$ Angle Girders bolted to the Girders 4. The other $3\frac{1}{2}''$ Rack Strip meshes with a compound rack segment consisting of three Rack Segments bolted together. Two $1\frac{1}{2}''$ Strips are attached to the Segments, and they pivot on a Rod passed through their end holes and journalled in 3" and $5\frac{1}{2}''$ Strips. Two $4\frac{1}{2}''$ Strips are lock-nutted to the Rack Segments, the upper ends of the Strips being lock-nutted to a Single Bent Strip bolted to the beam.

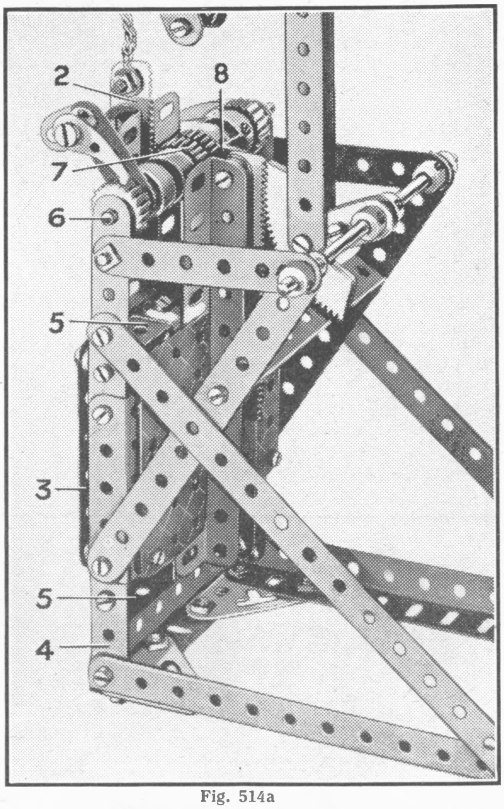


Fig. 514a

As the beam moves downward the compound rack segment causes the Rack Strip 8 to move downward also, thus rotating the $\frac{3}{4}''$ Pinion, the Crank and the Ratchet Wheel fixed on the Rod 6. During this action the $\frac{3}{4}''$ Pinion 7 that meshes with the Rack Strip 2 rotates idly, but when the beam is on its upward journey the Rack Strip 2 rotates this Pinion and the Rod 6 in the same direction as the Rod was moved during the downward stroke. Meanwhile the $\frac{3}{4}''$ Pinion that meshes with the Rack Strip 8 causes the Pawl attached to it to rotate idly around the Ratchet Wheel, thus imparting no drive to the Rod 6.

Meccano Model-Building Competitions

By "Spanner"

Prize-Winners in the "Originality" Competition

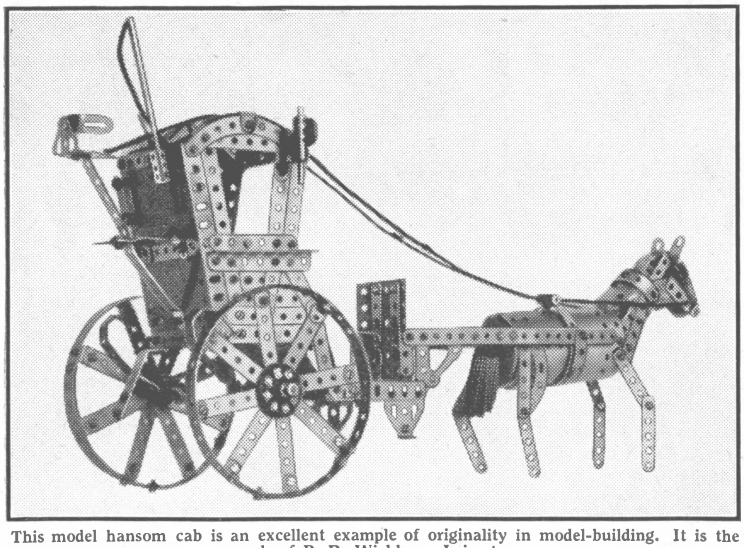
The results of the "Originality" Competition, which was announced in the March issue of the *"M.M.,"* are as follows:

First Prize, Cheque for £2/2/–: H. Neville, Aberdeen; 2nd, Cheque for £1/1/–: P. R. Wickham, Leicester; 3rd, Postal Order for 10/6: D. V. Thorne, Liverpool 20.

Postal Orders value 5/–: R. C. de B. Devereux, Kelsall, Nr. Chester; N. Howarth, Keighley; W. Mackellar, Helensburgh; E. Rusted, Nuneaton; F. Frost, Nottingham; F. Violett, Kenton.

First Prize was awarded to H. Neville, Aberdeen, for a fine model of a typewriter, which is shown in the upper illustration on this page. The model is a really interesting piece of work, and a very pleasing feature of it is the ingenious manner in which the very intricate mechanisms of such a machine have been reproduced. The model incorporates all the essential movements of an actual typewriter and is fitted with a standard pattern keyboard having 42 keys. Shift keys for capitals or small letters, figures, etc., spacing bar, margin release, back space and automatic line-spacing devices are also included. A neat reversing gear allows the ink tape to be wound back on to its original spool after it has run through the machine. The model is built entirely from Meccano parts except for a rubber platen, the type and the ink tape.

A model of an old time hansom cab, which is shown in the lower illustration, was successful in obtaining Second Prize for P. R. Wickham, Leicester. The cab is built mainly from Strips and Angle Girders, and is fitted with doors hinged to open outwards and an interior seat. A Coupling secured to the cab forms a whip holder, the whip itself being a Rod fitted with a Rod Connector in which is clamped a length of thick cord. Lamps on each side of the cab consist of Couplings mounted on Rods and secured to ¾" Discs.



This model hansom cab is an excellent example of originality in model-building. It is the work of P. R. Wickham, Leicester.

The shafts are Strips, which are attached to the cab and braced by Architraves. They are attached near their forward ends to the horse's harness, which consists of Strips bent round the neck and body of the animal. The legs, head and neck of the horse are formed from Strips, which are attached to a body represented by a Boiler compressed to oval shape.

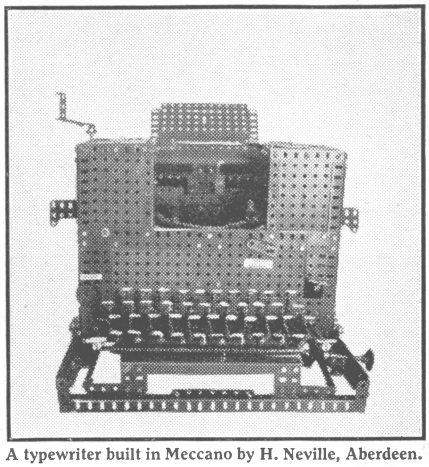
D. V. Thorne, Liverpool 20, was awarded Third Prize for a model of the Cunard White Star Liner *"Mauretania."* The model has an overall length of 4 ft. 3 in., and its hull is constructed mainly from Flexible Plates. The upper decks and the massive bow bridge of the liner are shaped with Angle Girders and Double Angle Strips, and the two funnels are Boilers covered with paper painted red and black.

A consolation prize was awarded to R. C. de B. Devereux, Kelsall, for a model of a gravel and sand washing, crushing and grading plant. It is driven by an E20B Electric Motor through reduction gearing, and represents an actual machine in which loaded trucks of sand and gravel are hauled from the quarry, and tipped into a ground hopper in the machine. From here an elevator transfers the mixture to the top of a vibrator, where the larger pieces are rejected and passed down a chute into a crusher consisting of two Pinions in mesh. The smaller pieces pass through screens, which sort them into groups, and finally are delivered to four storage hoppers. The sand is passed first into a de-watering tank, and then to a large overhead hopper from which it is loaded down chutes into lorries drawn up underneath. Dummy water pumps are provided and are driven by a No. 1 Clockwork Motor.

F. Frost, Nottingham, who was awarded a consolation prize, built a model testing machine suitable for testing road surfaces and their capacity to stand up to heavy traffic. It consists of a long arm built up from Angle Girders and Braced Girders, and pivotally attached at its inner end to a central support by four 5" Rods, which are arranged so that the length of the arm can be varied as desired. The length of the arm is controlled by two Triple Throw Eccentrics, which are mounted symmetrically on a Rod that carries also a ½" Pinion. This Pinion meshes with a Worm fixed rigidly to the central support. At the outer end of the arm a motor car chassis is attached and when this is set in motion the arm is rotated, thus causing the Pinion and Eccentrics to be driven and the track of the vehicle to be varied so that the whole of the surface is covered.

Prizes for Models in Outdoor Settings

This Contest was first announced in the June *"M.M.,"* and as it is still open for entries I am repeating the essential details for the benefit of model-builders who did not see the previous announcement. In it competitors are asked to submit photographs showing Meccano models set up in natural and realistic outdoor surroundings. Models need not be specially built for the purpose, and any model that is available may be used, provided that it has not been awarded a prize in any previous *"M.M."* competition.



A typewriter built in Meccano by H. Neville, Aberdeen.

Suitable subjects would be a scene in a railway goods yard, a telpher railway ascending a rocky hill, a steam shovel or a dragline at work in a miniature excavation of some kind, or a bridge erected over a stream in the garden. These suggestions will give competitors some idea of the lines on which they should work, and there should be no difficulty in finding other equally interesting subjects.

The main object of competitors should be to make their settings as lifelike as possible, and they will do this more easily with a simple setting than with an elaborate arrangement crammed with unnecessary detail. The model itself also may be quite a simple one, the main features required being good proportions and a realistic appearance.

The seasons in certain Overseas countries are exactly the opposite of those in Great Britain. For this reason competitors living Overseas are asked to send entries showing Meccano models in realistic surroundings of any kind, indoor or outdoor. This condition applies only to Overseas competitors.

In order to enter this Contest it is necessary to send a photograph of the model and its setting. Drawings cannot be accepted.

Prizes consisting of cheques for £2/2/–, £1/1/–, and 10/6 respectively will be awarded for the three entries that the judges consider to be the most realistic. Entries must bear the competitor's age, name and address, and should be posted to *"Summer Realism Contest,"* Meccano Limited, Binns Road, Liverpool 13.

The Contest will close on 31st August.

Club and Branch News

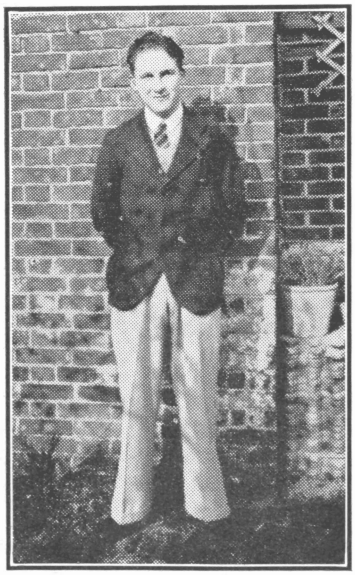
Looking to the Future

Perseverance and courage are necessary in these days, and Clubs and branches generally are doing magnificent work, as the example of the Plymouth M.C. shows. Mr. W. J. Ellis, the Leader of this Club, writes to tell me that their Headquarters have gone, but that they are continuing in new quarters. The evacuation problem has depleted their numbers, but has not lowered their spirits or diminished their determination, and they are going ahead with those who are left, looking forward to the days of peace when they can again forge ahead.

Clubs should take full advantage of the long light evenings we are now enjoying, partly to make up for time necessarily lost in the blackout conditions of the past winter, but partly also with an eye to increased activity later in the year. In particular membership must be kept up to full strength, and even increased if at all possible. There is plenty of enthusiasm among Meccano boys and Hornby Train enthusiasts, and all that is wanted is an outlet for it. One good plan to follow is to encourage members to bring their friends along on certain nights set apart for visitors. This is a particularly good time for such a practice, for evacuations and removals for various reasons have led to the formation of many new friendships.

Outdoor Meetings

There will always be days of fine weather, in spite of war conditions, and the long days provide plenty of scope for making use of it. Rambles are always popular, but those organising them should take care always to have some particular object in view, as boys do not really like walks for the sake of walking. In the neighbourhood of all Club Headquarters there are points of interest about which something can be learned from guide books and other sources. One or more of these should be made the objective, and the available information could be passed on to members, not in the form of a set lecture, but in the course of conversation. This plan has the special merit of encouraging boys to keep their eyes open and to see for themselves the interest that lies in many things in the neighbourhood.



L. S. J. Adkin has been secretary of the Denville (Havant) Branch, No. 358, since its formation in June 1938. The Branch was incorporated in October 1938, under the Chairmanship of Mr. T. W. Marshall, and members have enjoyed realistic operations on the Branch Hornby Railway with steel track, running both clockwork and electric services.

Excursions also could be planned to places where there are specially interesting trees or plants, or members could be encouraged to take notice of the bird life of their neighbourhood. There is usually some member of a Club who leans towards knowledge of the kind required for such outings, and he will find that his fellow members, especially the younger ones, will be surprisingly interested in what he has to tell them. Cycle runs should be planned and carried out in a similar manner.

Branch News

Ackworth School.—This Branch has now been incorporated and excellent meetings have already been held. At one meeting a coaling stage was made and buffer stops were installed. A large turntable is undergoing tests and a suspension bridge is being constructed. This work is being speeded up in preparation for a display in aid of Red Cross Funds. When running operations are in progress each member has his special duties to perform and full use is made of bells and indicators. *Secretary:* J. H. Mayo, Ackworth School, Ackworth, Nr. Pontefract, Yorks.

Martinwhite.—Meetings have been well attended and operations have been very interesting. Part of the support of the track has been reconstructed, and steel rails have now been introduced. This work was carried out under high pressure and good use was made of a special room that has been placed at the disposal of the railway engineers. A Gauge 00 layout has kindly been lent to the Branch by Mr. M. Smith. An enjoyable Cycle Run and other summer outings have been organised. *Secretary:* T. M. White, Bingham Stoke Road, Guildford.

Carmarthen.—Each of the weekly meetings has been devoted to some special pursuit, and members are greatly enjoying operations. At track meetings tests have been made of the ability of members to control trains. Passenger expresses and goods trains have been run, an interesting feature of goods train working being the carriage of rails for extending the siding. Automatic signalling has been installed, and members have been instructed in its operation. Chemical Experiments and Photography, with monthly Film Shows, make up the rest of the programme. *Secretary:* J. D. Lewis, 7, Spilman Street, Carmarthen.

Twyford Grove (Banbury).—Meetings were resumed when the evenings became lighter, and all of them have been devoted to train operations, in which troop trains and Government "Specials" often formed the principal feature. Next month the Branch Room will be open to visitors, and the proceeds of the display are to be given to the local hospital. Many models will be on view, and the Branch layout will be in operation almost continuously, with shunting displays as a special feature. *Secretary:* J. Prescott, 6, Twyford Grove, Banbury.

West Hunslet (Leeds).—This Branch has now been incorporated and several successful train meetings have been held. Goods Trains of various types have been run, and timetables have been worked out for both passenger and goods services. Shunting also has been practised. The layout is to be converted for electrical operation and more locomotives and rolling stock are to be acquired. The station frontage is being improved and Dinky Toys are being used to add more realism. *Secretary:* H. Jones, 4, Dewsbury Place, Dewsbury Road, Leeds 11.

NEW ZEALAND

Wellington West.—A system of interlocking points has been introduced, and a special large controller has been constructed. Club Room accommodation and the electrification of the track have been discussed with a view to further improvements, and the whole of the Hornby Dublo Rolling Stock has been overhauled and repaired. Track operations have continued steadily, including the running of "work trains," and the special Saturday morning meetings for the benefit of Junior members have been continued. Games Nights have been enjoyed. Subscriptions collected during one week in each month are being used for patrtiotic purposes. Copies of the "*Railway Gazette*" have been presented to the Library, along with other books. Track improvements are now being carried out. *Secretary:* K. R. Cassells, 26, Sugarloaf Road, Brooklyn, Wellington, New Zealand.

Club Notes

Royds Hall Grammar School (Huddersfield) M.C.—Meetings have been resumed in the Physics Laboratory, in which a good mains current supply is available. Use also is made of the Woodwork Room, where wooden bases and foundations for models are constructed, and enjoyable meetings are being held under the guidance of Mr. Poulter, Acting President. A special event was a Lantern Lecture illustrating the work of the Post Office, the slides for which were kindly lent by the G.P.O. Other Lectures are being arranged and active Model-building also is in progress. Club roll: 30. *Secretary:* D. Livesey, Royds Hall Grammar School, Huddersfield.

Members of the Royds Hall Grammar School (Huddersfield) M.C. at work, with Mr. P. V. Bates, Leader, looking on at the rear. On Mr. Bates' left is Mr. Poulter, Acting Leader and on his right D. Livesey, secretary. This Club was affiliated in October 1937. Members are fortunate in having good Club rooms in their school, and they make the most of their opportunities for building models of all kinds, including aeroplanes, as our photograph shows.

Barnard Castle School M.C.—A fine array of models was built for display at the Exhibition held this term. The Club Hornby Railway also formed part of the Exhibition, and many of the models were built for use in connection with it. One of them was a device for operating brake rails from a distance. A special Visitors' Day also was arranged, when former members who have now left the School were welcomed. The Club Room has been painted by the Senior members. Club roll: 15. *Secretary:* R. J. Churchill, The School, Barnard Castle, Co. Durham.

Hillside (Whitefield) M.C.—Interesting recent Lectures have dealt with "*British Fortresses in the Mediterranean*" and "*The Torpedo.*" Instructions have been given in the correct use of gas masks, and Mr. H. Norbury has given a demonstration on the best way of dealing with incendiary bombs. Model-building competitions are held fortnightly, and arouse great interest. A Visitors' Night is held at regular intervals to allow boys who cannot join the Club because of the limited accommodation to see what is being done. Club roll: 12. *Secretary:* D. I. Johnson, Burkewood, 27, Hillside Avenue, Whitefield.

Hornsea M.C.—Splendid meetings continue to be held by Engineers and Apprentices. For the Senior Engineers a special series of Lectures on aircraft and flying are being given. Interesting woodwork models have been made for use on the Club layout, which now consists of all-steel track. A new game introduced is bowls. Club roll: 24. *Secretary:* P. Richardson, 14, Grosvenor Terrace, Hornsea.

AUSTRALIA

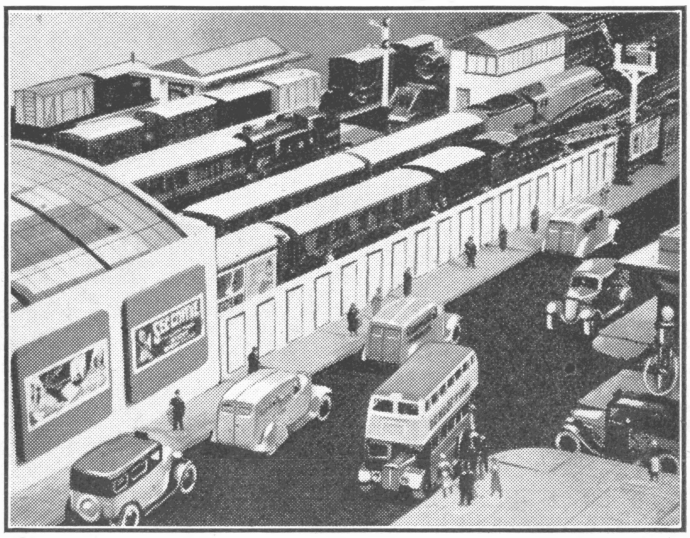
Melbourne M.C.—Meetings continue to be held monthly. Mr. L. Ison, Leader and secretary, has built a special model for demonstrating the bulk handling of wheat. Other meetings have been devoted to operations on the Hornby Railway. On one occasion members were asked to explain what was necessary for correct operation, and to observe carefully whether signals were correct and everything in order before train movements were started. Careful practice of this kind ensures smooth operations when train running is in full swing. At another meeting special goods trains were run to timetable, carrying actual parcels to members. Club roll: 11. *Secretary:* L. Ison, 8, Hayes St., Northcote, N.16, Victoria, Australia.

Here and There in Hornby-Dublo

IN the last few articles in these pages we have concentrated our attention on some particular aspect of Hornby-Dublo railway operation. This month, by way of a change, we intend to deal more generally with a number of subjects. This will probably prove more suitable for most of our readers in view of the fact that this is the time of the year when many will be thinking of holidays.

One of the most remarkable features of the equipment in the Hornby-Dublo range is its adaptability. By varying the uses of different items it is possible to secure a number of different effects according to the requirements of the model railway owner. For instance, the adaptability of the track components is well known, otherwise it would not be possible to develop so many interesting and realistic layouts.

Then consider the locomotives themselves; the streamline express Locomotive *"Sir Nigel Gresley"* has a surprising margin of power, so that although intended, as was its prototype, for the haulage of trains of moderate weight at high speeds it can deal also with heavy loads in a very satisfactory manner. In this its capabilities resemble those of the real streamliners. Present-day operations on the L.N.E.R. frequently involve the haulage of some very heavy loads. This practice if reproduced in miniature makes rather a spectacular change from the usual light formations of most model expresses. It may be necessary owing to restrictions in platform length to make special arrangements for the hauling of extra-long trains. Thus at the starting point the train may have to be assembled in two parts at separate platform faces, the two being combined immediately before starting. Again, at the terminal point it may have to be split into two separate parts so that the "passengers" can alight. At intermediate stops the drawing up of the train twice will follow the practice sometimes necessary in real life; the fitting of the train to the platform so that no vehicles overrun the end and the subsequent drawing up to bring in the tail of the train requires careful "driving" on the part of the operator.

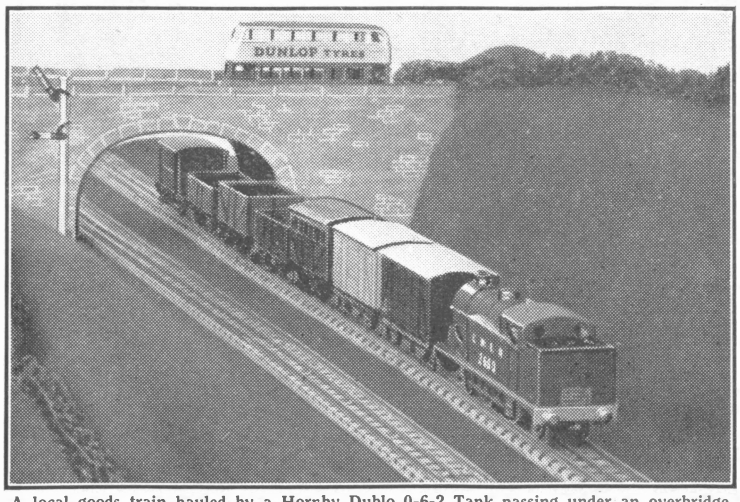


A busy terminus on a Hornby-Dublo railway. Both express and local trains are in the station and Dinky Toys vehicles are prominent in the foreground.

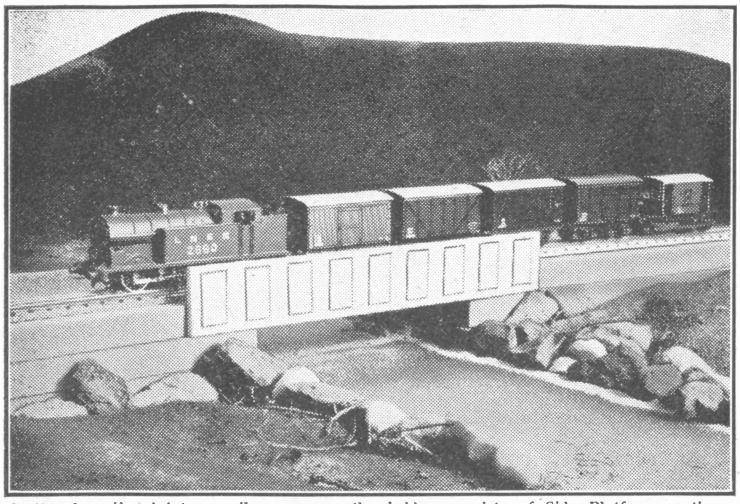
The haulage power of the miniature streamliner can be put to good use also in running fast freight trains, as we have frequently suggested in these articles. Real passenger engines often take a turn at fast freight work. This gives great scope to the miniature operator and enables him to fit in his engine duties very conveniently.

The Hornby-Dublo Tank Locomotive is included in a goods train set, but it makes also a most useful engine for local traffic, and of course for shunting generally. We have often recommended its use for suburban work, especially in conjunction with the Two-Coach Articulated Unit. This combination makes an ideal local train, very representative of L.N.E.R. practice, and for which it is not difficult to find room at platforms or in sidings. The articulation of the coaches forming the Unit means that they are always ready for use. The only coupling up required is that of the engine, and the automatic couplings fitted to all Hornby-Dublo stock make this a simple matter.

While dealing with passenger trains, either express or suburban, it is well to remind readers of the possibilities of arranging road motor services to connect with the railway services. Most Hornby-Dublo railway owners make use of Dinky Toys vehicles as part of the roadside effects in the neighbourhood of stations and elsewhere; few however seem actually to "run" their motor vehicles, such as Buses or Taxis. It is perhaps a little awkward to do for the operator who works single-handed, but where younger "assistants" are available they are as a rule only too willing to carry out this part of the work. Certain Hornby Railway Branches have developed combined operations of this kind to a high pitch, and have organised road services which form a regular part of Branch track nights. The same idea can be put into practice where several railway owners combine their stock and play together. The scheme is certainly well worth trying, and



A local goods train hauled by a Hornby Dublo 0-6-2 Tank passing under an overbridge made up as suggested in this article.



A "made-up" miniature railway scene: the bridge consists of Side Platform sections from the City Station Outfit. Other components from this Outfit are used to form approaches to the bridge.

a lot of fun can be had in this way.

Road freight vehicles also can be run to give a regular "collection and delivery service" in connection with railway goods trains. Such a service is a feature of modern railway working, and we have previously given suggestions as to the types of motors that can be used. These will depend to a certain extent on the types of railway vehicles that are in use to deal with the traffic supposed to be worked over the line. Open and covered wagons on the railway require corresponding vehicles on the "roads" for general cargo. For instance, meat and other perishables conveyed in special railway vans will require covered road vans, and for cattle traffic carried in the attractive Cattle Wagons a suitable vehicle on the road will be the Market Gardener's Van, the construction of which resembles a livestock "float."

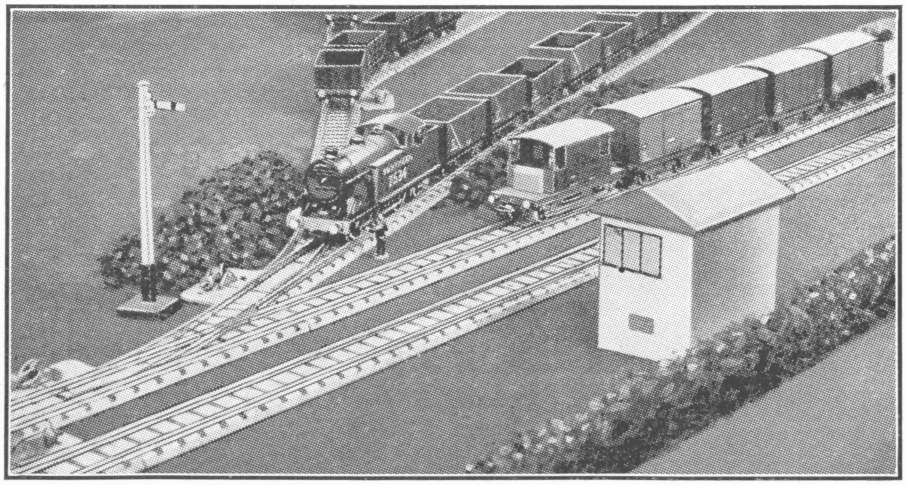
Special importance is attached to goods traffic under present conditions so that preference can be given in miniature operations to fast freight trains instead of to passenger traffic. This reversal of the ordinary course of things fits in quite well with the suggestion given previously in this article for the use of the streamlined engine on freight traffic. An air of importance will be given to any goods train headed by one of the Hornby-Dublo "Pacifics."

Readers frequently tell us of lineside effects of various kinds that they have carried out successfully, and we have included details in the different descriptive articles that we have published from time to time. Hornby Hedging can be pressed into use very effectively along the lineside of a Hornby-Dublo railway. Where this cannot so easily be employed, in places where the "ground level" is undulating for instance, or in the finishing off of tunnels and so on, ordinary moss can be pinned in position. Hornby Trees too can be used, and it is a good plan to cut the "trunks" of these to varying lengths so that the miniature "forests" and "woodlands" are not too uniform in appearance. The art of "growing" miniature trees is a somewhat difficult one but it is possible with a good deal of patience and practice to make use of small twigs to which pieces of loofah, or even sponge, well teased out and dyed or painted green can be attached.

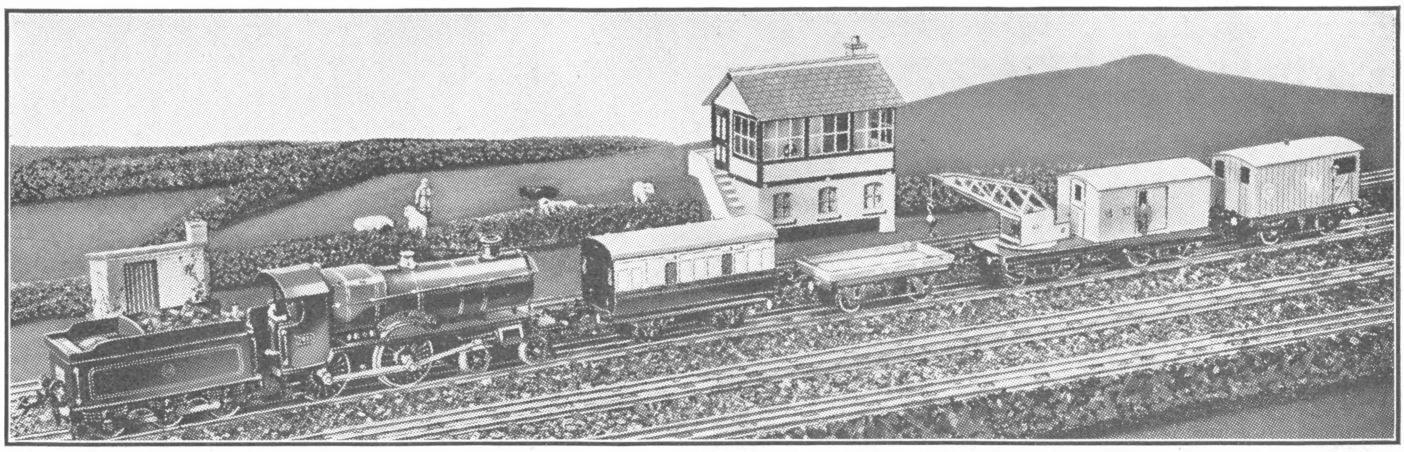
Sometimes, as a change from normal straightforward operations, owners of portable railways arrange a separate "scene" with their equipment rather than a complete track layout for actual running. This is quite amusing and where combined with photography it can be very fascinating indeed. Possibly the traffic or the railway side of things may be the chief point of the "set," some particular operation being depicted in which the individual model railwayman is specially interested. A shunting yard layout may possibly be arranged or perhaps some sidings laid in connection with some engineering work. The lower illustration on this page shows a scene of this kind: the engine is shunting wagons in sidings supposedly laid down in connection with the unloading of material. Such arrangements are often found where embankments are to be extended, levels raised and so on. The train that is passing on the main line is a typical fast freight made up of various Hornby-Dublo Vans.

Another type of scene is that shown in the upper illustration on this page. The waterway is made of glass, which should have underneath it a piece of coloured paper or any other material, dark green for preference. The "bridge" itself is made up of two of the Side Platform sections from the City Station Outfit. The actual platforms make up the deck of the bridge and the side walls form the girders. Ordinary Centre Platform sections are used also to form approaches to the actual span and the whole resembles a modern reinforced concrete structure.

A different type of bridge, in this case a brick built arched bridge, is represented in the lower illustration on the opposite page. Such a bridge can be made at home fairly easily, using wood for the main framework and sheets of card pinned and glued to this to imitate the actual brickwork. Painting in flat colours with a certain amount of lining out can be carried out to finish the bridge off, or alternatively some of the "brick-paper" that is sold nowadays for such purposes can be used. Separate sloping approaches can be made if desired, either to stand at right angles to the track or to be parallel to it. Dinky Toys Pavement components can be used to complete these.



Roadside work in progress in sidings while a fast freight train passes on the main line. This is another "scene" made up as suggested on this page.



A breakdown train on a Hornby Railway. The engine is running tender first as it has been hastily pressed into service in an emergency.

The "Locomotive Department" on a Hornby Railway

IN actual practice the work of the Locomotive Department of a railway does not end merely with the building and operating of the engines required to run the trains called for in the working time-tables. In addition to the provision of suitable engines and their assignment to particular duties, their accommodation, servicing and repair have to be attended to; and there are various items such as turntables and equipment connected with the supply of coal and water that come under the eye of the Locomotive Department. In this article we intend to deal with the items of this kind that are required on a Hornby railway.

The most prominent accessory that is needed by a Locomotive Department in miniature is an engine shed. Its size makes it a spectacular and satisfactory accessory but from the practical point of view it is something more. The engines should be kept out of the way when not in use and it is desirable too that they should be protected as far as possible from dirt and dust. This is where the real use of an engine shed comes in; it provides accommodation for the motive power in a realistic way and the storage of engines under cover helps to keep them clean

There are various Engine Sheds available in the Hornby Series: it is not intended to deal with these one after the other as details are available in our literature. They are of the same general type, representing a modern two-road brick-built shed with an ordinary peaked roof. Some are of the "through" type with double doors at each end; others are of the single-end type with doors at one end only, the other end consisting merely of a blank wall. All of them are fitted inside with two roads of tinplate type rails and these are the same distance apart as the "up" and "down" roads of Hornby Tinplate Double Track.

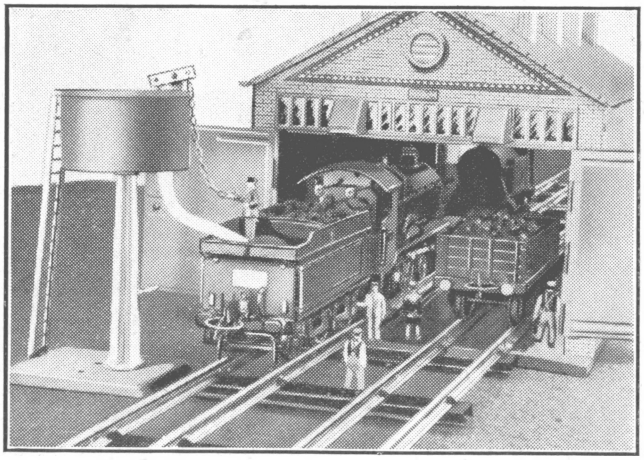
The exact type of Shed to be used will depend largely on the size of the engines to be stabled and the space available. The No. 1 type of Shed is equal in length to a standard Tinplate Straight Rail; the No. 2 type is exactly twice this length. With these details available it is easy to work out which type of Shed will fit in better with the conditions on any particular layout.

On a miniature railway system it is often necessary to include a turntable in one or other of the shed approach lines. Engines can then be turned, if required, when they are moving in and they can then be worked to the position "on the shed" that is assigned to them according to the rota of their duties. Another possible arrangement where the Shed is of the "through" type but where there is only one connection with the main line is to place the turntable at the "dead end" of the locomotive yard beyond the Shed. The turntable can then serve both of the two Shed roads and if space permits it can also be connected to an avoiding line leading from the entrance end of the yard. Incoming engines then pass by the Shed, onto the turntable, and so into the Shed where they wait until required for work again.

There are two sizes of Turntable in the Hornby Series, the No. 1 and the No. 2. The No. 1 is suitable for use with 1 ft. radius rails only and the No. 2 size fits into layouts where 2 ft. radius rails are used.

No locomotive yard could be complete without a water tank and the Hornby Series includes an attractive Accessory of this type. No special position can be laid down for the Water Tank, as conditions on individual layouts vary so much. The Tank however should be within easy reach of engines as they pass in or out of the yard. Large goods yards where shunting engines are employed continuously are usually provided with tanks. Similarly it is quite a good scheme to provide Water Tanks at the end of station platforms. Incidentally the stopping of the engine with its tender alongside the Water Tank forms a good test of the operator's skill.

Locomotive "coal supplies" in miniature are readily available in Hornby Imitation Coal which looks quite realistic when loaded up into engine tenders. The modern method of coaling in real practice is by means of a mechanical plant of which various examples have been described in the *"M.M."* and the "Hornby Book of Trains" from time to time. Meccano Parts can be employed to make up a plant where there is space for it but failing that the ordinary raised stage for coaling purposes is quite effective in miniature, especially if various miniature Figures are used to provide a certain amount of "life." In any case there is plenty of scope for the use on shed premises of High-Capacity or ordinary Wagons loaded with Hornby Coal.



A Hornby Engine Shed showing a locomotive "taking water" from a Hornby Water Tank. Note the Wagon alongside loaded with Hornby Coal.

Another feature of Locomotive Department work concerns the provision of breakdown trains in the event of any mishap. Such trains include a powerful crane and tool vans provided with appliances for dealing with all kinds of accidents. On a Hornby Railway quite an effective train of this kind can be assembled as shown in the upper illustration on this page. In this the Passenger Brake Van is used as a riding van for the breakdown crew and the Flat Truck represents the "match truck" commonly used to support the jib of the breakdown crane when travelling. As a rule the handiest engine available is hastily coupled up on receipt of a call for the breakdown gang, hence the "tender first" position of the *"County of Bedford"* in the illustration.

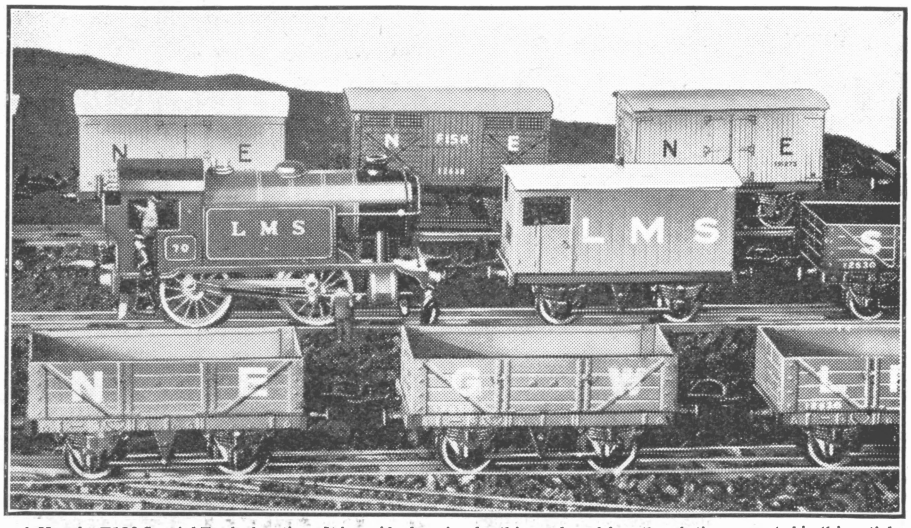
Fun with Hornby Four-Wheeled Tank Engines

THE various Tank Locomotives of the Hornby Series have always had a reputation for smartness and efficiency. In most of our articles dealing with them, however, prominence has usually been given to the largest, the E220 Special 4–4–2 Tank and its corresponding Clockwork counterpart. This month on this page we concentrate our attention on the smaller Tanks, all of which are four-wheelers, or of the 0–4–0T type.

Tank locomotives have several special advantages. They can be used equally well in either direction of running; they are compact and complete in themselves; and they gain by having no separate tender to be coupled up and hauled behind them. The four-wheeled type has particular advantages in miniature railway practice. The engines generally are short and therefore occupy less platform or shed space, and can be accommodated more easily on engine spurs and sidings outside terminal stations, and in goods yards. Space is always valuable on a miniature railway system, but even if there is little room to spare it is possible to develop quite realistic practice if the motive power is restricted to four-wheeled tank locomotives only. Various lines are operated exclusively by small tank engines, as for instance the Isle of Wight section of the S.R.

There are three types of Hornby 0–4–0 tanks, the E120 Special, the E120 and the EM320, and to each there is a corresponding clockwork model. For the remainder of this article we shall refer to the electric models alone, except where the clockwork models are specially mentioned, but reference to the corresponding clockwork types will be understood.

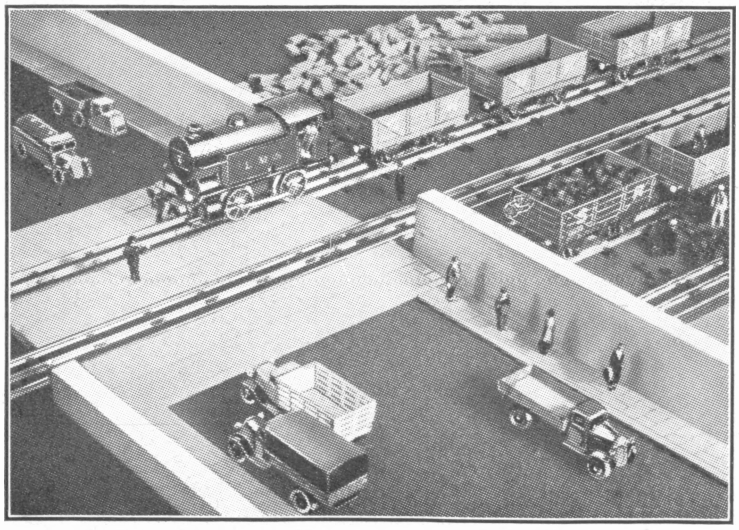
The E120 Special is the most imposing of the three types mentioned, and is for its size an ideal engine for intensive suburban passenger work or for heavy shunting, and roadside goods duties generally. A single engine of this type is a useful addition to any Gauge 0 miniature railway, and where several of the type form the only engines on the line a frequent "standardised" train service on the lines of the heavy traffic in and out of Liverpool Street on the Great Eastern Section of the L.N.E.R. can be operated.



A Hornby E120 Special Tank shunting. It is an ideal engine for this work and for other duties suggested in this article.

On layouts of a more extensive type trains can be made up of bogie stock using the Hornby No. 2 compartment-type coaches. Three of these, two Brake Thirds and a First-Third between them, make a nice load for this type of engine, its capacity being such that it can deal comfortably with a train of this size. Some miniature railway owners may prefer to concentrate on four-wheeled rolling stock. Then a very smart and effective suburban "set" train can be assembled with the No. 1 Coaches and Guard's Vans. These can be used in standard sets of say five, with a Guard's Van at each end.

A characteristic of real services of this kind, where several routes are served or various destinations are available, is the use on the engines of destination boards. These can be made of card with the appropriate names printed on them in Indian ink, such as "*King's* +." An easy way of mounting such miniature boards on the engine is to make use of the lamp brackets above the buffer beam. If the boards are made of such a length that they will pass in front of the centre lamp bracket with their outer ends held just behind the two outer brackets, they will stay in position quite successfully.



Road traffic held up for a shunting movement from one yard to another. The engine is an EM320 Tank.

The No. 1 Special Clockwork Tank requires the BBR1 Brake and Reverse Rail where the operator desires to work the brake or reversing gear from the track. This is an important point to note because where there are engines of different types in use, each requiring a different type of Brake Rail, disappointment is experienced when it is attempted to control one engine by a type of Brake Rail suitable only for another.

Similar duties to those suggested for the E120 Special Tank can be undertaken by the E120 Tank. Both types require 2 ft. radius curves in order to give the best results. The E120 is a smaller engine so that the loads on the whole will be lighter. Therefore passenger trains are best composed of No. 1 four-wheeled stock, and these should be kept assembled as set trains consisting of the number of vehicles found most suited to the capabilities of the engine.

Local goods trains also can be taken by the E120 Tank, and it is a very satisfactory engine for the shunting work incidental to such duties. The E120 model has to be reversed by hand, whereas the larger E120 Special has an automatic reversing motor. The Clockwork No. 1 Tank is controlled by means of the AB2 Brake Rail. This has two separate trips, either of which can be used for braking or reversing according to the direction in which the engine is travelling.

Lighter duties are undertaken by the EM320 Tank, and a special advantage of this engine is that it will take 1 ft. radius curves very well. This makes it useful for general duty on layouts where this size of curve is employed throughout; or on layouts where 2 ft. radius curves are used for the main running lines, sidings in odd corners can be incorporated, and an EM320 Tank alone employed for duty in such places. Such conditions are frequent in actual practice on dock estates, in harbours, and in the neighbourhood of warehouses and works. The EM320 Tank therefore makes a splendid "dock shunter," and in its wheel arrangement and general style resemble the engines of this type employed by the S.R. at Southampton.

The M3 Clockwork Tank can be braked by means of the AB1 Brake Rail; it can only be reversed, however, by manipulation of the lever projecting from the cab.

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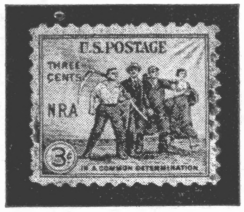

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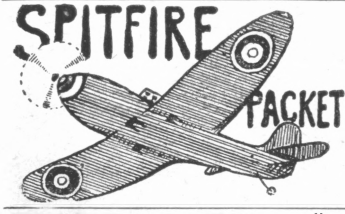

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STAMP COLLECTING

War Stamps of the United States

HAPPILY for Britain, the great resources of the United States have been ranged on our side in the present war. The factories on the other side of the Atlantic are pouring a rapidly growing stream of armaments to our aid and never had a nation at war a greater friend. Yet, oddly enough, most United States stamps that may correctly be called war stamps are commemorative of an incident or a leader in the great struggle that achieved for America its independence from British rule.

The first British settlers in America were the Pilgrim Fathers, who left their native land in order to be free to follow out their own religious ideas. Their landing at Plymouth Rock is commemorated on the 1c. stamp of the Pilgrim Fathers Tercentenary set issued in 1920. The other stamps of the set showed the landing of the Fathers (2c.) and the "Signing of the Compact of Independence from the Government" (3c.).

Although the settlers soon established friendly relations with the Indian tribes, it was not their fate to live for ever in peace, and in 1660 they were faced with attack by the Indians, who feared that the English were fast reaching a point of complete domination. There is not space to dwell on this phase of America's history, or with the conquest of Canada that led to Britain's complete dominion over the North American continent. Instead we must pass on to the middle 18th century when there was fast growing up a sturdy colonial stock that was increasingly resentful of the restraint imposed by a home government that saw in the colonies only the means to benefit the trade of the country.

The break came when an attempt was made to impose a Stamp Tax that required all legal documents to be drawn up on stamped paper purchased from Government officers. The tax was repealed, but the day was not saved. New taxes were imposed, and feelings ran high; clashes with the garrison became frequent in Boston. The colonists refused to buy tea, paper, glass, all dearly prized luxuries that were a great source of revenue to the government, and finally a band of men disguised as Mohawk Indians boarded three tea ships in the harbour and cast their cargoes overboard, an incident that has come down in history as the "Boston Tea Party."

As punishment for the "Mohawk" raid, the port of Boston was ordered to be closed to shipping. The State of Massachusetts denounced the British Government and had the open sympathy of the remaining States comprising Britain's American Colonies. A great conference of the States was held, and among those who attended was George Washington, whose portrait has adorned so many stamps of the United States. Benjamin Franklin, who has been almost as freely pictured on United States stamps as George Washington, crossed the Atlantic to plead the cause of the Colonies, and all the time secret preparations for war were going forward in America.

The British Governor, General Gage, knew of these preparations, and sent a party of 800 men from Boston to seize a store of arms at Concord. The alarm was given and at daybreak on 4th April 1775 the first blows for American Independence were struck at Lexington. The British achieved their mission at Concord, but the return to Boston was one long inglorious rout, and of the 800 who set out more than 300 never returned. They were picked off by the "Minute Men," guerilla warriors, ready to fight at a moment's notice, whence came their name, who fought from every tree stump and every roadside mound.

A set of three stamps was issued in April, 1925, to commemorate the Battle of Lexington and Concord, the designs showing respectively George Washington at Cambridge, a scene at the battle, and a picture of a typical "Minute Man."

Congress met and declared the final independence of the American colonies in 1775. Thomas Jefferson, another great American well known by his stamp portraits, was chosen to draw up the declaration, which was read formally on the 4th July 1776 at Philadelphia. George Washington was appointed commander-in-chief of the rebel armies, and the Royal Arms were taken down from the Philadelphia Court House and publicly burned. This event was commemorated on a U.S. Stamp as long ago as 1869, when a 24c. stamp was issued bearing a design showing the scene at the reading of the Act of Independence. This stamp is a rare specimen, however, and readers will find a more easily obtained substitute in the 2c. stamp issued on 10th May 1926 to commemorate the 150th anniversary of the event. The design of this stamp shows the famous "Liberty Bell" used by the Americans to sound the alarm.

It is not possible in the space of one article to give a detailed account of all the incidents depicted on the stamps issued in the United States during the years 1927, 1928 and 1929, to commemorate the principal events of the War of Independence. In addition to those we have already mentioned there are at least a dozen more, and to these must be added many portraits of leaders of the rebel cause that appeared during those years and subsequently.

A 2c. stamp issued 18th October 1926 commemorated the battle of White Plains, and showed a picture of Alexander Hamilton's battery in action. Hamilton later became a prominent American political leader. Bennington, a battle in which a British force was overwhelmed, was commemorated by a 2c. stamp issued 3rd August 1927, and the surrender of General Burgoyne's army at Saratoga is the subject of another 2c. stamp issued at the same time. Other battles marked by stamp issues are Monmouth, which was commemorated by a simple overprint on the 2c. stamp of 1922 which bore a portrait of Washington, Fort Sackville, a view being shown of George Rogers Clark at Vincennes, in what is now Indiana, to which he led an expedition to put a stop to Indian attacks on the Americans during the War of Independence, and lastly Fallen Timbers. This last stamp, which appeared on 14th September 1929, showed a portrait of General Anthony Wayne, the victor in the battle, which was not part of the War of Independence proper, but a punitive expedition against marauding bands of Indians who had been stirred into war by English still manning forts in the Ohio region.

An interesting aspect of the great struggle for independence was the great amount of help rendered to the rebels by volunteers from other lands.

(Continued on page 232)

War Stamps of the U.S.A.

(Continued from page 231)

Most romantic of these was the dashing Scotsman Paul Jones, who had settled in Virginia and felt the call of loyalty so strong that he carried the naval war even into English waters. He bombarded Whitehaven, sailed his schooner *"Bonhomme Richard"* into the Firth of Forth and threatened Edinburgh, and when driven away by adverse winds he fought and captured two British men of war in a battle off Flamborough Head. A portrait of Paul Jones and a view of his vessel appear on the 1c. value of the 1936-37 Naval Heroes series.

General von Steuben, a German who played a great part in training the rebel army, is shown on the 2c. stamp issued on 17th September 1930, while the Polish Generals Casimir Pulaski and Kosciuszko are shown on 2c. values issued on 16th January 1931 and 10th October 1933 respectively.

The final scene of the great war and the settlement of America's future is represented in our story by the 3c. stamp issued on 17th September 1937, the 150th anniversary of the signing of the United States Constitution. The design shows George Washington making his inaugural speech as First President of the United States.

The only other United States war stamp of note is our sole link with the Spanish-American war. One of the famous battles of this war took place in Manila Bay, in the Philippine Islands, where a Spanish fleet was destroyed by an American squadron. The scene at the battle is most vividly portrayed on the 2p. value of the Philippine Islands issue of 1935. A portrait of Admiral Dewey, commander of the U.S. Squadron, appeared on the 16c. stamp of 1923.

This War of Independence was the very birth of the United States as we know them to-day. Britain may always take pride that she bore the stock that founded this great nation, and that out of the mistakes of the past has sprung a friendship and mutual sympathy that is destined to be the salvation of the liberty of all free peoples.

Once before the United States and Britain have stood shoulder to shoulder in defence of the freedom of small nations, and it is appropriate to place last—but most significant—of all war stamps of the United States, that symbolic stamp "Liberty and the Allies' Flags," the 3c. victory stamp of March 1919.

* * * *

News of recent Dutch stamp issues has just come come through from America and it is interesting to learn that the usual Christmas Social and Cultural charity issues appeared. There were five stamps, each bearing portraits of famous Netherlanders as follows: 1½c., Vincent Gogh (1853-1890), painter; 2½c., E. J. Potgieter (1808-1875), author; 3c. P. Camper (1721-1789), physician; 5c. Jan Steen (1626-1679), painter; 12½c., Joseph Scaliger (1540-1609), a world-famous scholar renowned for his mastery of the Hebrew and Arabic tongues as well as Latin and Greek.

Stamp Gossip

and Notes on New Issues

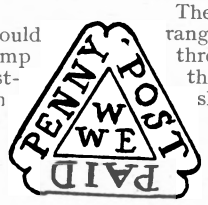
French Charity Shares

Most new issues to-day are of the type that British philatelists cannot buy, but it is of interest to record them so that some idea of the world trend of new issues may be known. France, that is the so-called "unoccupied" area, has issued four charity stamps to aid refugees ejected from their homes in Lorraine by the Germans. Each of the stamps bears the inscription *"Secours National"* and the designs are as follows: 80c., cutting the wheat harvest; 1 fr., seed time; 1 fr. 50, the grape harvest; and 2 fr. 50, cattle rearing. Each stamp carries a premium of 2 fr. in aid of the charity.

The Printing of British Colonials

One interesting development of the war that seems almost certain to occur is the gradual transfer of the printing of British Colonial stamps from London to other parts of the Empire, for example to Nasik, in India, where the Government Printing Offices are situated, Ottawa and Melbourne. Clearly every inch of shipping space must be saved and although even bulk supplies of postage stamps do not occupy much space, the irregularity of deliveries from London has to be considered. This has already compelled several colonies to issue locally produced provisional stamps to meet shortages arising out of delay in the arrival of new supplies.

The Blockade and Stamps



The Battle of the Atlantic would seem to have little to do with stamp collecting, but in fact it has interesting repercussions. While British dealers are busy sending stamps across the Atlantic to be sold in the United States, and thus gathering dollars for the use of the Government in the purchase of war supplies, dealers on the Nazi controlled Continent will not hear of selling stamps for American cash. They are interested only in sending supplies of new issues to be exchanged for early European stamps. They don't want dollars, since they cannot spend them in the United States with any certainty that their purchases will arrive safely. The new issues that the Nazi presses are churning out in the hope that collectors elsewhere will buy them, are so much paper—their loss does not matter.

American collectors are complaining almost as freely as those in Britain about the delay in obtaining news of new stamp issues. It is taking months for news of new European issues to filter through to the States, a fact that must be attributed to the keenness of Nazi censorship operations, due to fear lest a simple paragraph telling of a new stamp contain some hidden meaning or some conspiratorial message.

A Rare Dockwra Postmark

A fragment of early English postal history is to come up for auction at H. R. Harmer's rooms in London on 7th July. This is a complete letter posted through William Dockwra's London penny post on 4th May 1682. Adhesive stamps were not known in those early days, and Dockwra employed a handstamp in the form of a triangle, bearing around its three sides the inscription *"Penny Post Paid."* One of these postmarks is illustrated on this page.

Dockwra had several collecting offices from which runners were sent with the letters. Each of these offices had its own mark, bearing in the centre of the triangle the initial letter of the name of the place where the office was situated. Thus "T" was the letter for the Temple office and "L" that for Lime Street, then spelt "Lyme."

The letter to be sold by H. R. Harmer bears the Lyme Street Mark and is only the second known copy in existence. The other is in the British Museum.

New Pictorials for Arab States

Two of the independent States in the Aden Protectorate are to issue their own stamps. These are Qu'aiti (Shikr and Mukalla) and Seiyun.

The Qu'aiti State will issue 11 stamps, ranging from ½a. to 5 rupees, and three lowest values bear a portrait of the Sultan of Mukalla with a tablet showing the name of the State. The inclusion of the State in the Protectorate is symbolised by the word "Aden" at the head of the stamps and the figures of value are shown in Roman and Arabic characters. The higher values will show various views of the State as follows: 1½a., Mukalla Harbour; 2a., Gateway of Shikr; 2½a., Shibam; 3a., Outpost of Mukalla; 8a., Einat; 1R., Du'an; 2R., mosque in Hureidha; 5R. Meshed.

The issue for Seiyun will also comprise 11 stamps, with the three low values showing the portrait of the Sultan of Kathiri. The higher values will also be pictorials with designs as follows: 1½a., Seiyun; 2a., Tarim; 2½a., mosque at Saiyun; 3a., Tarim; 8a., mosque at Seiyun; 1R., South Gate, Tarim; 2R., Kathiri House; 5R., door of mosque at Tarim.

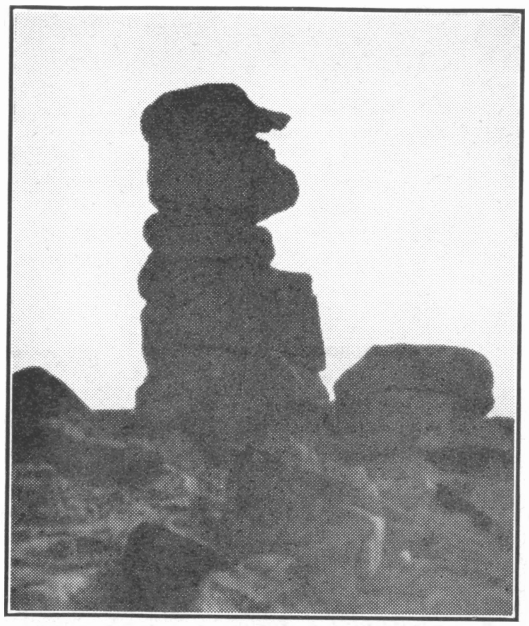
We hope to illustrate these stamps in and early issue.

* * * *

The recent "Free French" issue from Equatorial Africa has just arrived in Britain. The complete series comprises 34 stamps for ordinary postage and five air mail stamps. They consist of the current series of French Equatorial Africa overprinted with the simple inscription "Libre," as shown in the specimens illustrated on this page.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.



A Dartmoor silhouette that suggests a caricature of Mussolini! Photograph by S. S. Pethybridge, Newton Abbot.

The Duce on Dartmoor

When motoring on the moors one day, and passing Bowerman's Nose, a well known Dartmoor landmark, I noticed the remarkable resemblance to Mussolini that this rock seemed to have when silhouetted against the Sun. I therefore decided to photograph it, and the result is reproduced on this page. It will be seen by readers to be very like a caricature of the Duce that exaggerates his famous chin and shows him wearing a ski-ing or base-ball cap.

S. S. PETHYBRIDGE (Newton Abbot).

An Interesting Museum

I have come from London to Richmond, Yorkshire, for the duration of the war, and during a holiday I visited Bowes Museum, a large building on the outskirts of Barnard Castle. Its founder was John Bowes, a traveller who married a French artist. During his travels he collected many treasures and decided to found a museum to hold them. He chose Barnard Castle as the site, and the foundation stone was laid by Madam Bowes on 27th November, 1869. The park in which the building stands is open to the public and contains many fine plants and shrubs.

It appears that Bowes was very fond of china. There are many different types of porcelain in the Museum, four large rooms containing splendid examples. There are also tapestries and pictures, many of the latter by Madam Bowes herself, and in one room is a large collection of objects from the South Sea Islands. To me the most interesting exhibit is a set of rooms on the top floor devoted in 1935 to the display of local archæological exhibits and special features of life in Barnard Castle and the upper part of Teesdale. These objects are displayed in a natural setting with a Teesdale kitchen, dairy and Victorian room as background. Three almost forgotten industries in Barnard Castle also are represented here. These are weaving, rope making and clogging, and it is interesting to realise from the display how people formerly lived in Teesdale.

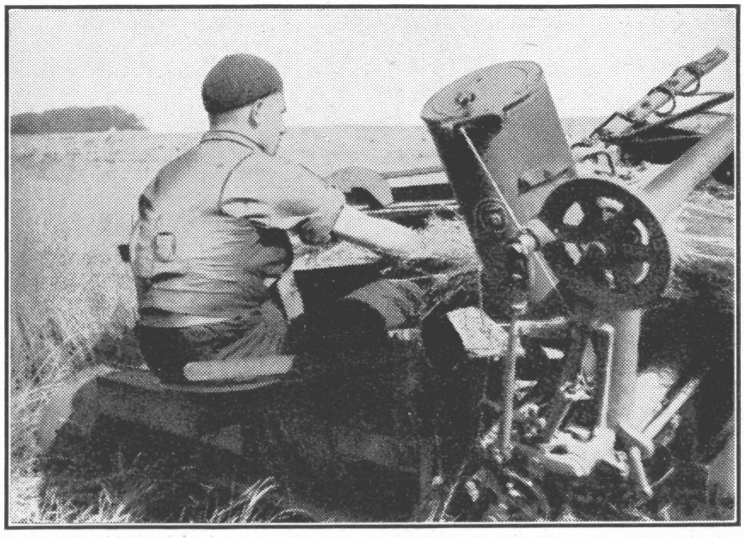
A. N. BENSON (Richmond).

Farming Fen Floodlands

There are lands in England that so far as is known have never been cultivated. These once included the fenland washes, which have in the past acted as safety valves to the fertile fens by taking surplus water from the waterways in the winter, when they are usually drowned to a depth of several feet. It has needed the present war to bring a part of these wash lands under cultivation.

Last year two enterprising business men in the fens decided that it should be possible to grow flax and other crops on at least a part of these washes. A dam was built across one of the main waterways, so that the water in this could be lowered, and drag lines or excavators were used to recut such drains as had at one time existed and to cut new drains where this was necessary. Caterpillar tractors were used for hauling the ploughs because no other kind of tractor would keep on top of the land and big pneumatic-tyred wheels from lorries had to be strapped to the ploughs themselves to keep these from sinking in. The result was 250 acres of excellent flax to help the country in time of need and 15 acres of good quality potatoes.

This year the work is being done on an even bigger scale, and nearly 500 acres of land are being cultivated. Drain pipes 3 ft. in diameter are being used to carry the water from the wash through the high banks into the tidal river when the tide is down. Self-acting sluices close the mouths of these pipes when the tide is up, and open them when the tide is low, then letting huge quantities of water flow from the washes every minute through the three great drains that have been excavated across the newly cultivated land to feed the pipes. This year, as a result, it has been possible to grow more flax, potatoes, sugar beet and other food crops such as oats.



A flax puller at work in fenland washes never cultivated before last year. Photograph by J. W. Morton, March.

I have visited the wash several times and seen the huge tractors with their ploughs, the 12-ft. disc harrows, the excavators, the dam in course of construction and the complicated flax pulling machines at work.

J. W. MORTON (March).

Mont St. Michel

Just before the outbreak of war I spent a fortnight in a Scout camp in Normandy. While there I visited a village called Pontorson, near which is Mont St. Michel, a steep-sided rock rising from the sea and connected to the mainland by a causeway. An abbey perched on the rock was once the home of Benedictine monks, and right at the top of the abbey, on a pinnacle, is a statue of St. Michael the Archangel.

The road up to the abbey winds round the rock and in places is so steep that steps have had to be cut. On each side there were postcard and trinket vendors who shouted at the tourists, telling them what they were trying to sell, and cafes abounded.

There were many gendarmes, usually in pairs, who looked at us suspiciously until they realised that we were Scouts.

At one place in the abbey I looked down to a vertical drop of at least 500 ft. The mount, or rock, is surrounded on all sides by treacherous sands. These are flat, and the tide, which goes out about 1½ miles, comes in with the speed of a galloping horse, so that anyone who is far out on the sands when the tide turns has little chance of being saved. In some places too there are dangerous quicksands, and many of the graves on the rock are really monuments commemorating the deaths of persons who lost their lives there.

On the right of the causeway out to the rock is a canal up which the tide sweeps with a bore about 4 ft. high. On the causeway itself there is a road and a light track for a Michelin rail car; when it was coming, we could hear it a long way off because of the curious note of its French horn. I visited Mont St. Michel twice, and the second time I went across the sands to see some rocks about a mile beyond it. These visits were special features of a most enjoyable holiday.

J. SCULLY (Oxford).

SUPERCHARGING THE PILOT FOR STRATOSPHERE FLIGHTS

(*Continued from page 209*)

would undo all his supercharging effort and expose him to the "bends." As a result, the pilot puts on his flying suit in the decompression room, while still "hitched" to the oxygen cylinder. Before leaving to climb into his machine he switches to a small portable oxygen flask that is carried to the aeroplane, where the pilot immediately connects his inhalation apparatus to the oxygen tanks.

Commenting on Burcham's successful test flights, Marshall Headle, Lockheed's veteran chief test pilot, who has been flying since the first World War, and who took the P-38 up for its first check flights, pointed out that the speed with which the new fighting aeroplanes can climb above 30,000 ft. will make it necessary for some means of supercharging combat pilots for high altitude manœuvres.

"Very little good is accomplished in developing aeroplanes capable of high speeds in the stratosphere," Headle pointed out, "if the pilots are not in condition to utilise that speed and performance when they reach their objectives. Reactions are always slower at high altitudes, even with an adequate supply of oxygen, and speeds are greater. Any further handicap could easily render the pilots virtually useless and jeopardise their safety."

NOTES ON EAST ANGLIAN EXPRESS RUNNING

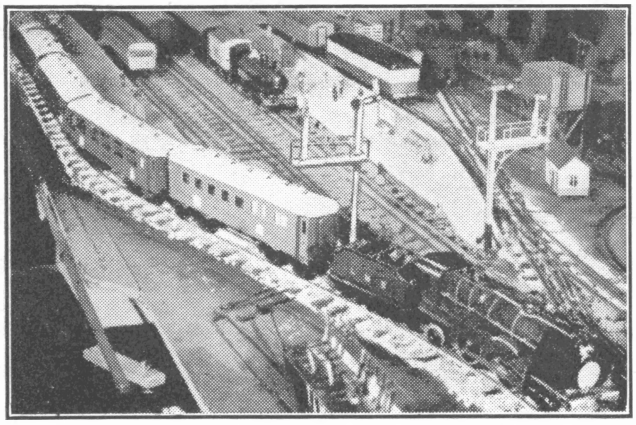
(*Continued from page 211*)

Suffolk line beyond Ipswich that the gradient profile looks like the teeth of a saw! "*Blickling*" put up some lively travelling over these miniature highlands in a "flat country," speed ranging from 33½ up 1 in 90 to 77 down at 1 in 100 bank.

In 1937 a beautiful 6-coach train weighing 219 tons was built to inaugurate the "*East Anglian*" express service which, as timed until withdrawn in 1939, provided the quickest run (2 hrs. 10 min.) ever booked between Norwich and London, each way with an Ipswich stop. The allowance of 48 min. in either direction for the Ipswich-Norwich stage was the fastest G.E. timing, averaging 58 m.p.h. As a matter of fact on many a journey up and down this run was made at a mile a minute average; or even in as little as 42-44 min. several times.

Two "Sandringhams" were specially tuned up in the works for operating the service from Norwich shed. In keeping with the times, and as a useful measure of publicity rather than as a mechanical necessity, they were streamlined. They were renamed "*East Anglian*" and "*City of London*" respectively, being numbered 2859 and 2870. Both have a remarkable record for consistent performance for months on end. The "*East Anglian*" certainly created some new speed standards over the route such as the regular ascent of Brentwood bank northbound at from 45-50 m.p.h., or the rapid regaining of speed after the numerous normal or interposed service slacks. The two locomotives were fitted with Flaman recorders and the drivers were instructed not to travel at more than about 80, though this maximum was often attained and sometimes 84 or 85 m.p.h. was touched, so that time was generally well in hand and a fine reputation was earned for punctuality.

Under more favourable peacetime conditions when the engineering work is completed the overall schedule might well be cut to 2 hrs. for the 115 mile trip with one stop. The train is not streamlined and is finished in L.N.E. varnished teak externally, but internally the accommodation is on the luxurious lines of the "*Coronation*" or "*West Riding Limited.*" Supplementary fares were not charged, though all seats were bookable in advance, being much in demand.



A scene on the "Sherwood Forest Railway" belonging to Mr. V. Sissons, of Worksop, Notts.

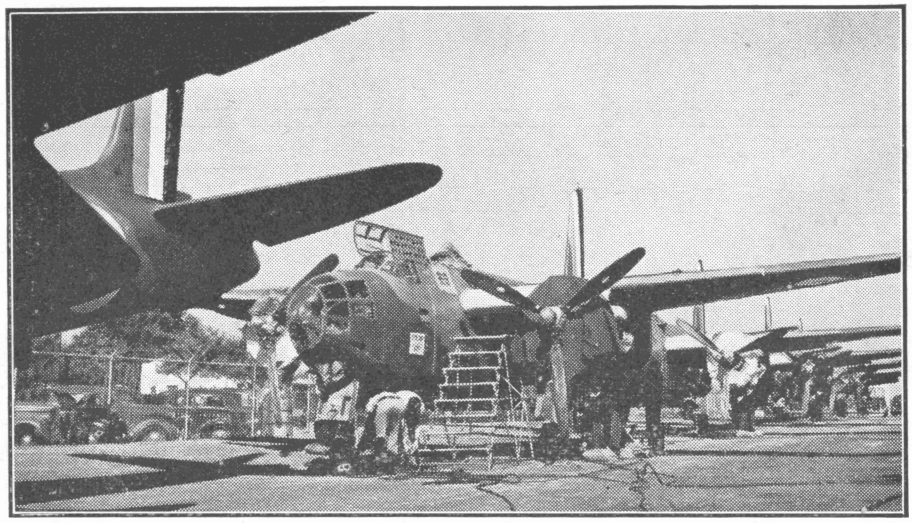
MASS PRODUCTION OF AMERICAN BOMBERS

(*Continued from page 217*)

and emerge from these as sections of wings and fuselages, thus minimising handling and storage, and saving time. The new method has actually reduced the number of handlings of materials by half. For instance, one aeroplane part that formerly travelled between the first and second floors of the factory several times now moves only 6 ft. during its fabrication. The flow of materials has become practically continuous, going from jig to jig at regular intervals; and when practicable the jigs themselves move along on tracks, thus saving production space and speeding-up operations. This flow is to be accelerated still more by modernising the factory trucking system, which will then operate rather like a railway system, with "trains" of trailer-trucks run to a schedule as in the case of real trains.

Wherever in the Douglas factory this straight-line technique of assembly has been applied, scheduling and planning have proved to be greatly simplified, and production per area of floor space has been nearly doubled—a factor of immense importance in view of the great number of aircraft to be produced.

The Santa Monica plant is now so vast that it has been found necessary to erect special signs at the many intersections of its streets and avenues, to enable employees to find their way about! It covers an area of 1,500,000 sq. ft., and if laid out as a rectangle with a width of 200 yd. it would be a mile long. At the beginning of this year the plant was employing over 16,000 men and women, and no doubt this number is now higher. Materials and aircraft parts are delivered about the plant by a trackless railway system in which quiet-working trucks each haul a line of five or six orange-coloured cars, with a brakesman aboard the rear one. The final assembly hangar is surmounted by an airport control tower that overlooks the factory aerodrome where the completed aircraft are taxied under test and take off for test flights. A radio station allows two-way communication to be carried on between the machines in the air and engineers on the ground.



Douglas bombers in line outside the factory, receiving finishing touches. (See special article on page 216.) Photograph by courtesy of Douglas Aircraft Company, Inc., U.S.A.

A FINE HORNBY LAYOUT

The extensive system of Mr. V. Sissons of Worksop, Notts., has four stations and is electrically operated, the total length of track in use being 226 ft. The train in the foreground consists of Hornby No. 2 Pullman and other vehicles finished to represent the "Mitropa" cars so well known on the Continent. The engine is an E320 "Royal Scot" which like the other engines on the line is now finished in the "Company's" own shade of green. Signalling is a feature of the system and many of the freight vehicles and accessories have been built by the owner from scrap material. The layout can be viewed by appointment and readers anxious to do so should communicate with the Editor. A feature of the line is that it boasts a collecting box in aid of the N.E.R. Cottage Homes.

TANKS AND BREN GUN CARRIERS

(*Continued from page 207*)

carrying about 20 picked riflemen who, by this means, were to be rushed to some vital point and reinforce it or take it before the ordinary infantry companies could reach it on foot.

The Bren gun itself is, of all machine guns, the one possessing the greatest degree of all-round utility. It is simple to operate—its assembly ready for action involves five motions only; if a barrel becomes overheated through firing it can be removed and replaced by a new one in four seconds, while its accuracy far surpasses that of any other machine gun. To take full advantage of it, therefore, some form of swift transport became necessary.

The latest type of Bren gun carrier is equipped with a steel hood as a protection from dive machine gunning from enemy aircraft; and this, coupled with their speed, has enabled many a detachment to rush in and, by their fire, turn the scale at a critical moment.

In general it may be said that in all these mechanised units the British models are in no way behind those of the enemy; in fact in many cases the equipment is much superior. Only in numbers do we fall short, and that is a defect which is rapidly being overcome, thanks to the efforts of Britain's workers in the shops. But in spite of the importance that has been rightly attached to mechanisation in all its forms we must never forget that in the last resort it is the men who win the battles—the men who man these fighting vehicles. Of them, as of the men of the Navy, the poet might well have written the well-known lines:

"Vain, mightiest fleets of iron framed,
Vain, the all shattering guns;
Unless Old England keep, untamed,
The proud hearts of her sons."

PHOTOGRAPHIC CONTESTS FOR READERS

Every reader of the "*M.M.*" who possesses a camera will be interested in the photographic competitions organised by our advertisers Johnson and Sons Ltd. The third competition in the 1941 series closes on 31st July, and will be followed by two others closing on 30th September and 29th November respectively.

Of chief interest to most of our readers will be special contests arranged for photographers of 18 years and under. The first of these, Competition A, closes on 31st July, and entries in it may be of any subject or subjects. Competition B closes on 29th November, and entries in this must depict holiday scenes. In each competition there are two classes, one for those who do their own developing and printing work and the other for photographers who do not.

In all these competitions there are many handsome prizes and no entry fees, all that is necessary being that labels or the title panel of a printed carton from certain photographic products sold by Johnson and Sons Ltd. shall be sent with each entry. A competitor may send in as many entries as he wishes. Full details are given in a leaflet that can be obtained from Johnson and Sons Ltd., Hendon, London N.W.4. The "*M.M.*" should be mentioned when writing.

LEARNING THE MORSE CODE

On page 186 of last month's issue we described an interesting scheme for learning to receive and send Morse. A reader of the "*M.M.*" has pointed out that the scheme would be very greatly improved by avoiding the use of the words "dash" and "dot," using instead the signs Da and Di, pronounced dah (long vowel) and de (short vowel) respectively. The *sounds* of Morse would then be readily learned and speed would be achieved from the start.

COMPETITIONS! OPEN TO ALL READERS

A Novel Meccano Figureword

For our contest in this month of July, when days are, or should be, hot and sultry, and readers spend most of their time out of doors, we have devised a simple puzzle that can easily be solved with the aid of pencil and paper only. The puzzle is easy to understand and requires little or no application to [illegible]ut, so that every [illegible]hould make a point of sending in his entry, as his effort will have an excellent chance of winning one of the fine cash prizes that are offered.

On this page is a diagram with seven rows, each consisting of seven blank spaces. Into these spaces letters that make up the names of seven Meccano Parts must be inserted, the names to be read horizontally.

In the last column of the diagram are numbers marked "Horizontal totals." These totals are made up by giving numbers to each letter of the alphabet, and adding up the numbers of the letters that make up the Meccano Parts names. The system is simple, each letter being numbered according to its position in the alphabet. Thus A is represented by the figure 1, B by figure 2 and so on down to Z, the value of which is 26. The numbers representing the letters of each Part name must add up to the horizontal totals and further the letters must be such that the vertical totals are those shown at the foot of the diagram.

S							105	HORIZONTAL TOTALS
							80	
							56	
							60	
							97	
							87	
							96	
81	80	65	82	94	73	106		
VERTICAL TOTALS								

As a help to make a start, we give the first letter of the first name. This is S, the value of which is 19. Thus the first Meccano Part to be introduced is one beginning with S, and this letter contributes 19 to the horizontal total of 105 and to the first vertical total of 81.

In entering for this contest readers must not cut the diagram from the page. Instead they should copy this out on a sheet of paper, a very simple matter, and then work out their solution. They may make this as original and ornamental as they like, and in the event of a tie for any one of the prizes the judges will take these features into consideration.

There will be two sections in this contest, for Home and Overseas readers respectively, and in each prizes of 21/–, 10/6 and 5/– will be awarded for the best entries in order of merit. There will be consolation prizes for other efforts that are deserving of recognition. Competitors should take care to write their names and addresses clearly on their entries, and these should be addressed *"Meccano Figureword, Meccano Magazine, Binns Road, Liverpool 13."* The closing dates are 31st July in the Home Section and 29th November Overseas.

Hidden Train Names

The modern practice of giving names to famous trains is a very interesting one, and readers of the *"M.M."* are familiar with these names, British, Continental and American. In our contest this month we are giving them an opportunity of making use of their knowledge of the famous trains of the United States, and at the same time of exercising their detective skill.

Below we give a story into which the words making up the names of 14 of these named trains have been introduced. Some of the names consist of single words, but others have two or three words in them, and in one case there are actually four. What competitors are asked to do is to hunt out the words, which may occur anywhere within the story, and then to fit them together to make up the 14 names. For instance, the first word in the story is "Abraham," and nearly half-way through is the word "Lincoln." These two together make up the name *"Abraham Lincoln,"* a train of the Baltimore and Ohio Railroad that runs through Springfield, the home of Abraham Lincoln for many years.

Here is the story:

Abraham Boardwalk came out of the Rocket Club and walked as straight as an arrow down the street. Reaching the Capitol Super Cinema, the best in the city, he paused to look at the pictures of Hiawatha which were displayed on the walls. He then continued on his way and turned into New Haven Street. Coming to the railroad station he went in, and looking at the indicator noted where some of the trains were going. Such places as New York, Los Angeles, Detroit, Portland and Lincoln. Some were local trains serving the suburbs. Continuing on his way through the city, he came to the Miami restaurant, but decided that he would go to the Choctaw cafe instead. After completing his meal, he proceeded on his way, and took the liberty of calling to see a friend of his who was the chief of the Twentieth Century Motor Company Limited, with whom he had a long conversation. He intended to visit another city, and said that if he went by train it would have to be a real flyer such as the Lightning Limited, as he was to get there and back in the shortest time, if possible during daylight. After the conversation he proceeded to his home, and being in a hurry he boarded a bus which made only a limited number of stops.

When the list of named trains has been made out it should be copied on a postcard and forwarded to *"Hidden Train Names, Meccano Magazine, Binns Road, Liverpool 13."* Competitors must remember to put their names and addresses on the postcard.

There will be two sections in this contest as usual, for Home and Overseas readers respectively, and prizes of 21/–, 10/6 and 5/– will be awarded in each case to the senders of the best entries in order of merit. In addition there will be many consolation prizes. Entries in the Home Section must be posted to arrive on or before 31st July, and the closing date in the Overseas Section is 29th November.

COMPETITION RESULTS

HOME

May "Doublets" Contest.—1. J. Parkinson (Accrington); 2. E. Moss (Church); 3. W. R. Bamford (Rochdale); 4. I. Hindle (Baxenden). Consolation Prizes: H. Moss (Oswaldtwistle); C. Prowse (Leeds 8).

May "Errors" Contest.—1. G. B. Whyte (Galashiels); 2. C. Auty (March); 3. W. A. Williams (Leicester); 4. T. J. Watson (London S.E.26). Consolation Prizes: C. F. Clarabut (Wembley); J. Marsh (Winchester).

May "Photo" Contest.—First Prizes: Section A, S. S. Pethybridge (Newton Abbot); Section B, M. Gainsborough-Waring (Shepperton). Second Prizes: Section A, A. C. Ellis (Huddersfield); Section B, A. Rose (Ulverston). Consolation Prizes: I. Alexander (Glasgow); W. Barr (Birkenhead); E. M. O. Smithers (Sedbergh); M. W. Taylor (Southall); R. J. Taylor (Bradford).

OVERSEAS

January "Cover Voting" Contest.—1. M. Laulscher (Johannesburg); 2. R. A. Holmberg (Singapore, S.S.); 3. H. C. Morgan (Nova Scotia, Canada); 4. F. Jowett (Toronto, Canada). Consolation Prizes: D. Gosling (Alberta, Canada); G. Myburgh (Cape Town, S.A.).

July Photographic Contest

This month we announce the fourth of our 1941 series of photographic competitions, in which competitors are asked to submit photographs of any kind that they have taken themselves. An entry may consist of more than one photograph, but each print submitted must have on the back of it a title. If a photograph is given a general or fancy title the real name of the place shown also must be written on the back, while the competitor's name and address, and age also must be given.

It is not necessary that the developing and printing should have been done by the competitor. These can have been carried out professionally, so long as the entrant himself has made the exposure. Competitors should take care to avoid including in their photographs any scenes or objects of military, naval or Air Force interest. Guidance in regard to this point was given in the Editorial and the Guild Secretary's Notes in our April issue.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16, and in each section prizes of 15/– and 7/6 respectively will be awarded. There will be two similar sections with prizes of the same value for Overseas readers, with consolation prizes for other good efforts in each section.

Entries in this month's competition should be addressed *"July Photo Contest, Meccano Magazine, Binns Road, Liverpool, 13."* The closing date in the Home section is 31st July and that in the Overseas section is 29th November.

Prize-winning entries become the property of Meccano Ltd. Unsuccessful entries will be returned if a suitable stamped addressed envelope is enclosed.

FIRESIDE FUN

GOOD ENOUGH

An impudent fellow met an Irishman in the street.

"I was just thinking, Pat," said he, "that you would make a fine monkey if you had a tail."

"Sure it's queer," said Pat. "I was just thinking meself that you would make a fine monkey without any alteration at all."

* * * *

The savage African tribe of Ubangis have a habit of stretching the lips of their women around circular wooden discs until finally they become about eight inches in size, sticking right out from their faces like two plates.

One very hot day two Ubangi girls met in the jungle. One of them stuck her face up close to that of the other, and rapidly repeated:

"Peter Piper picked a peck of pickled peppers! Now you fan me a while."

* * * *

Landlady: "I won't charge you for breakfast, seeing you didn't eat any."

Boarder: "That's good—I couldn't sleep either."

* * * *

THOUGHTFUL

"Are you doing anything for that cold of yours?"

"I sneeze whenever it wants me to."

* * * *

Orderly Officer: "Any complaints?"

Mess Orderly: "Yes, sir. Bread's wrong, sir."

Orderly Officer: "What's the matter with it?"

Mess Orderly: "Contradicts the laws of gravity, sir."

Orderly Officer: "Explain, my man."

Mess Orderly: "It's as 'eavy as lead, but it won't go down."

* * * *

An absent-minded professor went into a shop to buy a jar. Seeing one upside down, he said, "How stupid; the jar has no mouth!" Turning it over, he was more astonished. "Why, the bottom's gone, too!" he cried.

* * * *

New Tenant: "Your advertisement said that this room had a heavenly outlook."

Landlady: "Well, and ain't it got a skylight?"

* * * *

WHAT COLOUR IS MAN?

When he is mad we call him red. When he is a coward we call him yellow. When he is straightforward we call him white. When he is loyal we call him true blue. When he is running over with enthusiasm and pep we say he is colourful. When he is quiet and reserved we say he is colourless. What colour is he anyway?

* * * *

"Yes," said the boasting reporter, "I always carry my notes in my head."

"I see," said the Editor, "News in a nutshell."

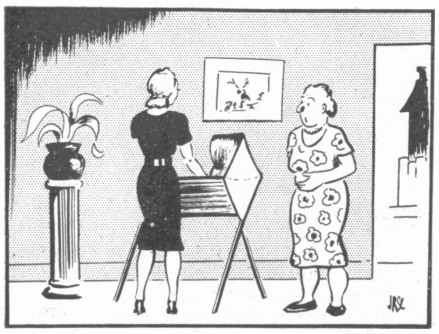
* * * *

Teacher: "A ruler that is hated and feared is called a tyrant. Now give me a sentence with 'tyrant' in it."

Pupil: "The teacher hit the boy with his tyrant."

* * * *

THE WARNING NOTE



Neighbour: "Why use such a high crib for your baby?"

Mother: "So we can hear him when he falls out."

TOUGH JOB

Hotel Manager: "You've been a long time blacking those boots."

New Boots: "Well, sir, it's not my fault. Some of them were brown when I started."

* * * *

"Does that Mrs. Gabber talk much?"

"Does she? You ought to have seen how sun-burned her tongue was when she came back from her holiday."

* * * *

WELL EARNED

Jim: "Who gave you that black eye?"

Joe: "No one—I had to fight jolly hard for it!"

* * * *

An Englishman visiting Western Canada wanted to see some typical mountain scenery, so he hired a car and told the chauffeur to do the best he could inside of two hours, which, he explained, was his time limit.

It was rather a hair-raising experience, the car careering up hill and down dale at a terrific speed. However, the man-in-a-hurry was satisfied, and congratulated the driver when paying him off.

"But, I say," he remarked, "I'm afraid we must have run over something an hour ago. I distinctly felt a bump."

"Bump?" replied the driver. "Bump? that was the Rocky Mountain divide."

* * * *

Farmer: "Have 'ee any seats left?"

Box-office Clerk: "Only stalls and boxes—sir."

Farmer: "Go on, what do 'ee take me for? A cart-horse?"

* * * *

He must be an electrician's son for he knows watts watt.

* * * *

Monsieur: "To-night I will steal beneath your balcony and whisper a sweet serenade."

Madame: "Do, and I will drop you a flower."

Monsieur: "Ah, in a moment of love?"

Madame: "No. In a pot!"

* * * *

Teacher: "How many fingers have you?"

Tommy: "Ten."

Teacher: "And if five were missing what would you have?"

Tommy: "No music lesson."

* * * *

Two slightly inebriated men met in the street.

One said: "Can you tell me the time?"

"Yes," replied the other.

"Thanks," said the first as he staggered away.

* * * *

"Professor! There's a burglar in the library!"

"Dear me, what is he reading?"

* * * *

The following notice appeared in a large factory: "Any employee wishing to attend the funeral of a relative must inform the foreman before 10.0 a.m. on the date of the match."

* * * *

Passenger: "What's the use of time-tables if the trains are always late?"

Porter: "What's the use of waiting rooms if the trains are always on time?"

* * * *

THIS MONTH'S HOWLER

A buttress is a female goat.

COMPETITION

Book-keeper: "I'll have to have a rise, sir; there are three other companies after me."

Boss: "Is that so? What companies?"

Book-keeper: "Light, 'phone and water."

* * * *

A farmer's son decided to be a lawyer. His father drove him into town and got him a job as office boy to a law firm. Two days later the young fellow was back home again.

"Well Josh, how do you like the law?" his father asked.

"Aw, it ain't what it's cracked up to be," said the boy. "I'm sorry I ever learned it."

* * * *

"Is Jones a reckless driver?"

"Reckless! Why, if the road turns the same way as he does its just a coincidence!"

* * * *

Judge: "Seven years hard labour."

Prisoner: "But I'm an old man me lord. I'll never live to do it."

Judge (kindly): "Never mind, just do as much as you can."

* * * *

"I speck I'd bettah give dat lady a wide berth," said the coloured Pullman porter, as the stout lady got into his car.

* * * *

A schoolmaster caught a small boy scribbling something on a slip of paper. Confiscating it, he read: "Blow, blow, draw, blow, draw, blow, draw."

"What's the meaning of all this?" he asked.

"Please, sir, it's the music for my mouth organ."

* * * *

PREPAREDNESS

A stranger came into the small town grocery store and asked for all the old eggs on hand. The grocer smiled.

"You must be going to the Town Hall to-night to see Hamlet played."

"No," was the grim reply, "to-night I am going to the Town Hall to play Hamlet."

* * * *

The old iron and junk man was pushing his barrow along a country lane. Behind him the impatient driver of a car was blowing his horn for room to overtake.

The junk man left his barrow in the middle of the lane, turned round and surveyed the rather ancient car.

"All right, guv'nor," he said, "I'll call round for that to-morrow. I'm full up now!"

* * * *

A distinguished visitor to a lunatic asylum was having great difficulty in getting his connection on the telephone. Exasperated, he shouted to the operator. "Look here, do you know who I am?"

"No," came the calm reply, "but I know where you are."

* * * *

The stationmaster of a country station was bending over a pan of boiling water sterilizing his whistle.

"What's he doing?" a man who was waiting for a train asked a porter.

"Oh, he's used up his week's ration coupons so he's boiling the pea for his dinner!" came the reply.

* * * *

The biology professor was lecturing to some students. "I will now show you some fine specimens of dissected frogs," he said.

Unwrapping the parcel a few sandwiches and a vacuum flask came to view.

"But surely—I ate my lunch!" he exclaimed.

* * * *

Captain of Football Club: "What are you like at full back?"

New member: "Oh, passable."

Captain: "That's no use, we already have a full back that's passable. What we want is one that's not."

* * * *

A SWELL TEAM

"Who are we playing?"

"Stamford Villa."

"Are they a hot lot?"

"Aa should think they are. They've got goal-posts!"

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HORNBY DUBLO

GAUGE 'OO'

THE PERFECT TABLE RAILWAY

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Hornby-Dublo Electric Trains operate on Direct Current at 12 volts. The current can be obtained from Alternating Current Mains Supply through a Dublo Transformer and a Dublo Controller No. 1.

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